Dr. Evans' How To Keep Well

A HEALTH BOOK FOR THE HOME

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BY

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WITH COLORED PLATES AND OVER FIVE HUNDRED ILLUSTRATIONS IN THE TEXT

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TO MY WIFE

WHO MAKES IT HER DUTY
TO KEEP ME WELL

"Why shouldest thou die before thy time?"
—Eccl. 7:17.

PREFACE

While Health Commissioner of Chicago, I was invited by the Chicago *Tribune* to take charge of a Health Column ("How to Keep Well") which they proposed to establish. The proprietors of the *Tribune* said they believed that by joining them not only could I continue the good that I was doing for the people of Chicago as Health Commissioner, but that I could reach more people and make my work of much wider influence through such a column as they proposed to establish.

There is a great reservoir of information on medicine which is sufficient to prevent most diseases and to cure most of the developed ailments. If there was to be an elevation of the standards of health, resulting in greater efficiency and lower sickness and death rates, it was necessary that this great reservoir of information be tapped and a means found for getting this information to the people. The Chicago *Tribune* believed that they possessed the means—a great daily newspaper, with a large circle of readers. That they were right and that my column "How to Keep Well" has been of real benefit to the people, has, I believe, been proven by the fact that there are now over four hundred newspapers following substantially the *Tribune* plan; and during the past six years, several million readers have had the opportunity to read "How to Keep Well" each day in the year.

It is apparent to anyone who analyzes the known existing condition of public health that something is needed. People drift into incurable—in some instances fatal, in others disabling—conditions because of lack of knowledge about the human body, health and disease; because of lack of elementary knowledge of both curative and preventive medicine. A hundred or more health surveys have been made in various parts of the country; some in cities, some in small towns and some in rural communities. Some have been made in industrial plants, some in farming communities and some in business establishments. The conclusions reached by all the investigators are practically the same. They are all in substance that: when it comes to knowledge of diseases, their causes, their manifestations and their cure, the average man or woman is uninformed. When it comes to perfect health and the means of achieving it, the average man or woman either does not know or else does not apply what he knows. A large percentage of people in need of medical service are not availing themselves of such service. The methods of preventing disease are being neglected by the people themselves. On top of all this, demonstrating both the proof of the conclusion and the need of some effort, the investigations show that more than half the people are in some measure incapacitated by disease most of which is preventable and nearly all of which is curable. This condition is all the more inexcusable when it is borne in mind that the majority of these people only needed counsel as to wrong habits of eating, sleeping, exercising, worrying and using alcohol or tobacco.

This line of reasoning led me to the opinion that there was a need for such a column and that it could be made influential with the several million prospective readers. Then the question arose: Could I accomplish this end or any considerable part of it?

I was reared in the country and in a small town. I had practiced medicine

in this country place among my own people. I had moved to a large city and practiced medicine there. I had conducted a clinical laboratory. For sixteen years I had taught pathology in one large medical college. For nearly half as long I had taught hygiene and sanitation in another. I had been active in tuberculosis work, infant welfare work and other campaigns waged in behalf of preventive medicine. I had served as health commissioner of the second city in the Union. I might not be able, of course, to do all that "How to Keep Well" would demand of me but, I reasoned, whose experience had been broader, more varied or more preparing than mine? It was up to me.

The next question which arose was—how could I keep in touch with what the people wanted as well as with what they should have? Of course I could depend on "sensing" the demand. But a person is so apt to "sense" what he wants to "sense." There is no method for "sensing." I talk health to popular audiences a great many times during the year, I belong to all sorts of health and medical organizations and I attend them; but I could see where these, as methods of discovering what was wanted, were insufficient. The plan hit upon was questions and answers. By encouraging questions I would be informed daily as to the popular mind.

And so I have found it. To change any of the habits or customs of a people it is necessary to know them just as they are and to appeal to them in terms of their daily experiences. The "Questions and Answers" department was founded with a view to keeping the column in touch with the people. Experience demonstrated that it was the most effective part of my efforts. The questioner asked a direct question in which he stated specifically what he wanted to know. The answer was direct, stating specifically my reply to the question asked. The reader interprets the question and answer. He either sees a specific answer or he sees that the answer is not specific. If not specifically answered he can form an opinion as to why it is not. The largest element contributing to the success of "How to Keep Well" is the "Questions and Answers."

And lastly, I saw that if, making use of these approaches, I was to tap the great reservoir of medical information for the benefit of those who needed it I must keep "How to Keep Well" just as human as possible.

Out of this work grew this book. The strong appeal of the "How to Keep Well" articles, as they appeared from day to day, resulted in a very large number of requests that they be put in permanent form. During the past five years I have written a great deal, the result of much work, study, investigation and research; but I believe it has proved to be of real and permanent value. It is these articles, revised in the light of the latest discoveries in the science of medicine and surgery, together with much new matter, which has not appeared in the newspaper, that make up this book. This new material, I believe, will make this book especially helpful, as it covers a number of subjects which could not be discussed in a newspaper column. The questions and answers contain many hundreds of letters received by me and my answers to them. Some of these letters and their answers are now published here for the first time. Among the most helpful features in this book, that did not appear in the newspaper, are the illustrations. There are over five hundred of them and they have been collected from three sources: (1) new illustrations made especially for this book; (2) the most helpful illustrations, charts, diagrams and tables of the various state and municipal boards of health and national bureaus; and (3) illustrations selected from other medical works of established merit.

For assistance in preparing this book I am grateful for the help given

by Doctor A. R. Reynolds and Mr. Wyatt Rushton as well as the publishers. As will be noted, for illustrations I have drawn freely upon various national, state and municipal boards of health and various other governmental agencies and various publications. I wish to thank them for the privilege of using these cuts and illustrations.

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HOW TO KEEP WELL

CHAPTER I

Introduction

THE ADVENT OF PREVENTIVE MEDICINE—JUST A START

Between birth and death is life. Life occupies itself with its own continuation. Human life seeks to promote not only its continuation but to make it enjoyable. We were long in finding that out.

For a long time the starting and stopping points were considered most important. Life itself, the journey from birth to death, was not well under-

North Carolina Health Bulletin.

FIG. 1.

stood. It was not studied, measured, much thought about or valued. A person lived until he died—that was definite.

Whether he lived a healthy, enjoyable life and died at a good old age, or dragged out a miserable existence, pestered by many ills, devoured by fierce diseases, and died young, was no one's concern. Most men fell early victims to this ignorance and general indifference.

There was a reason for this then, as there is no reason for the existence of the same state of affairs now. Food was scarce, life was cheap, health a negligible quantity, death a release for the victim, a relief to the survivors. They went away unwept.

It is different now, at least in one respect. Wealth is piled up. The individual can produce more than he can use. He is a valuable economic asset to the state.

In the other respect, in longer and healthier life, much is still as it used to be. Infant mortality, contagious diseases, tuberculosis, social diseases, occupational diseases, and the general waste of health and life attest this.

An initial improvement is, however, noticeable. Preventive medicine is becoming an established science; the laws of health and disease are better understood; conservation of health is becoming a national policy. The people are waking up. A new era is at hand.

WHAT IS HEALTH?

When man emerged from the purely animal state and woke up *homo sapiens,* he found life hard and death easy. Of health he at first knew only through disease. When he was tortured by pain or any other physical ill, he prayed for deliverance. When deliverance came he blessed it as health.

That health is a godsend of man's making did not occur to him. For many centuries health was considered as something beyond the control of man. It was a gift from the gods, given or taken at the caprice of unknown powers. That our own conduct and mode of life brings health or disease was not recognized until much later.

That health is the greatest asset of life the following, from an ancient author, testifies:

"O blessed health! Thou art above all gold and treasure, the poor man's riches, the rich man's bliss—without thee there can be no happiness."

Modern medical science teaches that health is the harmonious and painless co-operation of all the organs and parts of the body: of the unconscious and adequate response of the whole body to the various changes in the environment. It depends on natural laws as much as the flowing of water down hill.

We are not the playground for good and evil spirits who torture and trifle with us while we helplessly look on. Rather are we living machines, more finely built and more properly adjusted than any other machines in existence.

Your machine is subject to all the great laws of nature, in charge of an engineer who should be well fitted for his post by virtue of his intelligence.

If intelligence and a clear understanding of the laws of life were more

widely spread, and if these laws (which are simple in the main) were more carefully practiced, there would not be so much disease and suffering. As it is, universal lifelong health is the far-off dream of a few workers in the field of human health conservation. The many neither think of health nor have it. We may all ask with the prophet Jeremiah: "Is there no balm in Gilead? Is there no physician there? Why then is not the health of the daughter of my people recovered?"

There is balm in Gilead and elsewhere, and that is scientific understanding of the laws of life. There is a physician there, and that is the application of nature's laws to life and the removal of all hindrances to health. There is recovery possible, just as soon as we understand that we cannot hold our life positions unless we make good as engineers of the human machine.

HEALTH CAN BE BOUGHT

There is a popular idea prevalent concerning health to which frequent expression is given thus: "You can buy everything for money, but you can't buy health."

This is erroneous. The truth is that we cannot buy health after it is thrown away and broken. Second-handed, tinkered-up health is hard to buy, nor is it worth much. But good, first-rate health can be bought, like any other commodity.

Let it be clearly understood that health and money are convertible things. That health is sold and thrown away for money is a well established fact. With foresight and wisdom, the reverse can be made true.

We can get health for money. It can be had at less cost in the end if bought in season. The proper time to buy health for yourself and your family is before the present supply (I am afraid we have not much on hand; we have been shortly supplied to begin with) is exhausted.

I am led to write about this subject for the reason that the people of Chicago will soon be in the market to buy a supply of good, vigorous, first-rate health to last them for a year. Individual bargaining is impossible. We do not know enough about it; also it would cost too much to order in small lots.

We must authorize our representatives, whosoever they may be, to represent us in this matter. They, with their expert assistant, the commissioner of health, can buy it and deliver it to us at reasonable rates and guarantee satisfaction.

Now, how much money are we going to give them for health protection, for insuring the health and lives of ourselves and of our children? Last year (surely, I do not want to embarrass any citizens, but the truth must be faced), last year, I say, we each handed our representatives the magnificent sum of twenty-five cents and told them to buy us health protection for that amount.

Did we really expect to get efficient protection for that sum? If we did, we have much to learn. If we did not, we have been playing the fool with ourselves. In either case we have much to regret.

The impossibility of buying health protection for the community at

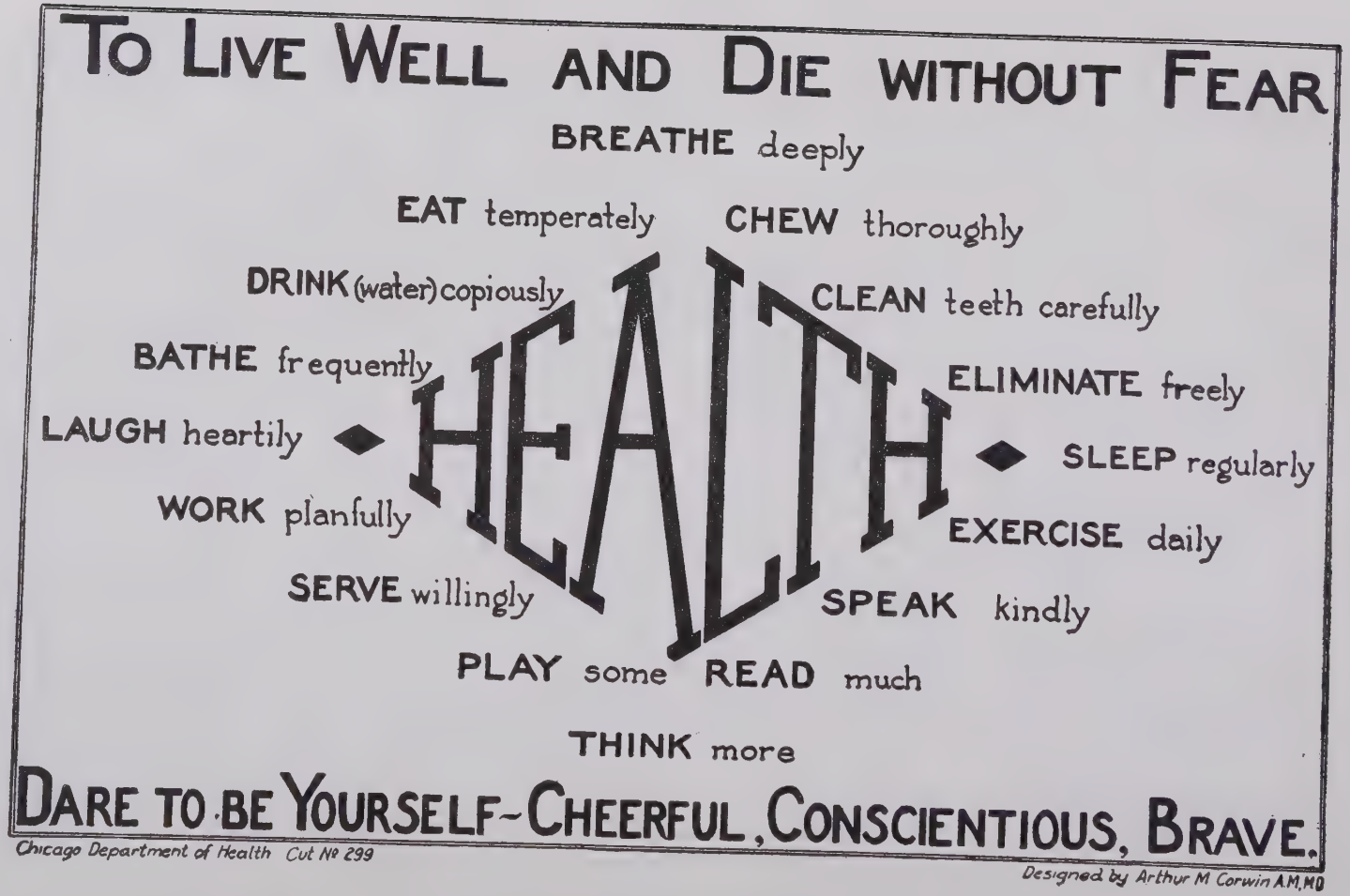

TO LIVE WELL AND DIE WITHOUT FEAR
BREATHE deeply
EAT temperately
CHEW thoroughly
DRINK (water) copiously
CLEAN teeth carefully
BATHE frequently
ELIMINATE freely
LAUGH heartily
HEALTH
SLEEP regularly
WORK planfully
EXERCISE daily
SERVE willingly
SPEAK kindly
PLAY some
READ much
THINK more
DARE TO BE YOURSELF-CHEERFUL, CONSCIENTIOUS, BRAVE.
Chicago Department of Health Cut No 299
Designed by Arthur M Corwin A.M. MD

FIG. 2.

twenty-five cents a head for a year is proved by several thousand unnecessary deaths during the year.

We thought we were striking a splendid bargain; but figure it up. Figure up the loss of time, your doctor's and undertaker's bills, and you will find that you have lost out; that you have paid dearly for what you thought you bought cheaply. We have lost both in money and in lives.

Let us be sensible this time. A twenty-five-cent health department cannot efficiently protect us. Other cities are paying from fifty cents to one dollar per head. Chicago has done wonders with the little it has had, but it fell short pitifully in proportion to the amount of good that could be accomplished with a more liberal appropriation for health purposes.

A dollar a head is not too much. We spend much more privately and collectively for things that are of far less importance.

Chicago cannot afford to have its babies die and its most useful men and women carried off in the prime of life. Municipal thrift at the expense of the lives of its citizens is a criminal blunder.

Buy health when it is still possible to buy it—before the hand of disease is laid on it. Buy it and pay for it and insist on getting your money's worth.

When we authorize our mayor and councilmen to buy health for the city for next year it must be with the understanding that they can invest a dollar for each citizen of our community for the protection of his life.

ENDING WELL

Metchnikoff writes of the possibility of eternal life. He speculates on the possibility that some day the human body will be shielded from all accidents, a proper adjustment between work and food will be maintained, and the body will be subjected to no adverse influences except legitimate wear and tear.

Among accidents he not only includes such palpable incidents as being run over by street cars, gored by bulls, and falling into thrashing machines, but also all bacterial diseases and intoxications. He says that in a properly regulated society there will be no scarlet fever, diphtheria, consumption, or pneumonia. In the list of accidents he would include inflammatory rheumatism, diarrheas, and appendicitis.

Of course that day is far off.

Chronic bacterial infection of the intestinal tract causes putrefactions and absorption of bacterial products, which he holds to be largely responsible for what we now call senility. Bright's disease and heart disease he considers divisible into two parts—the large part the result of old infections; the smaller part the result of a bad adjustment between food and work.

A proper adjustment between food and work is remote.

These things having been adjusted, he suggests that the body cells may be able perpetually to repair wear. While we are waiting it is comforting to know that human life is longer each year.

Men engaged in handling live stock say that an animal should live five times as many years as it takes it to get its growth. On this basis the proper age of man at death is at least one hundred years.

In 1909 *in Chicago eight men died who were over* 100; 146 *died between*

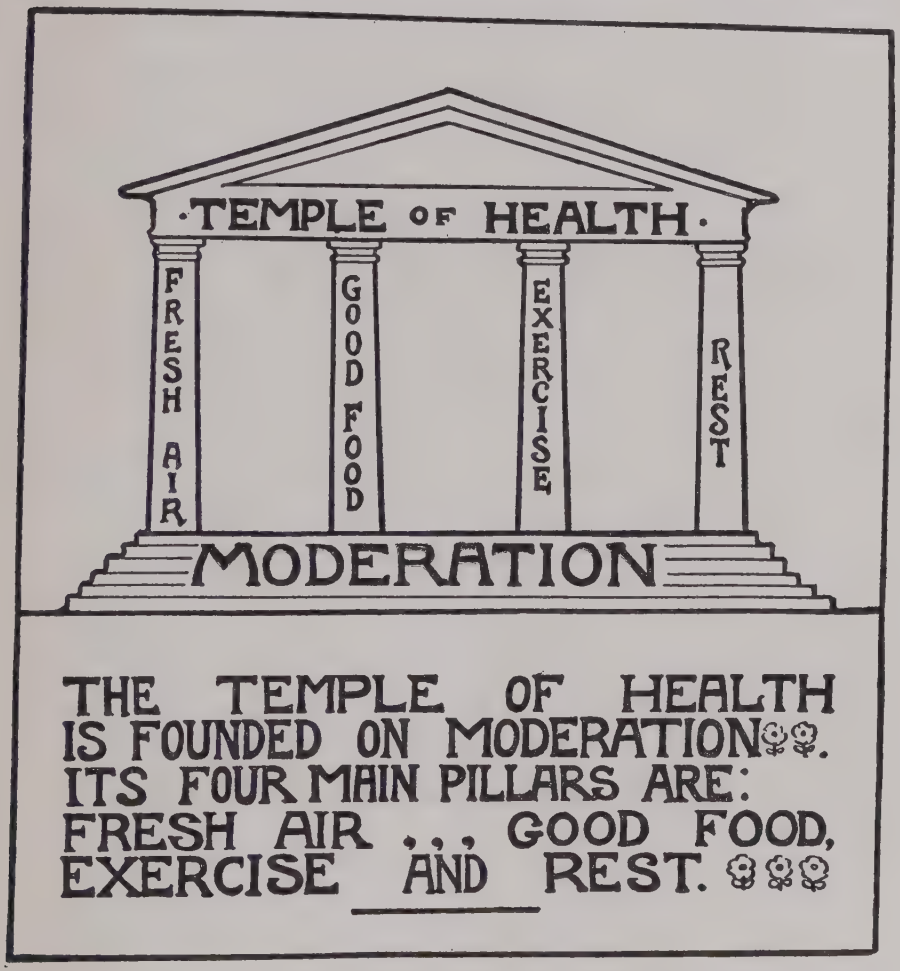
WHY?
Pa Ma John Mary Ben Sam
1 2 3 4 5 6
A FLY VISITED AN OPEN PRIVY AND
COLLECTED SOME TYPHOID GERMS,
THEN GATHERED TUBERCULOSIS
GERMS FROM SAM'S SPIT, AND LATER
DROWNED IN THE MILK PAIL THE
FAMILY DRANK THE MILK
A LITTLE LATER PA AND MA AND
LITTLE BEN BEGAN TO FEEL TIRED
ALL THE TIME AND TO COUGH A GREAT
DEAL. JOHN AND MARY CAME DOWN
WITH TYPHOID FEVER — — SAM
DIED-NOBODY CARED, AND
EVERYBODY AVOIDED THEM
HOG CHOLERA GERMS GOT INTO THE
PIGS FEED, AND THE HOGS BECAME
SICK BUT NOT FOR LONG HOG
CHOLERA SERUM WAS RUSH-
ED TO THEM AND EXPERT VET-
ERINARIANS W ERE HURRIEDLY
CALLED
CHAS VAN OTTEN
PA MA John MARY BEN SAM
1 2 3 4 5 6
THE RESULT
THE RESULT

Chicago Health Department.

FIG. 3.

90 *and* 100. *This was just about an average year in this particular. In this year* 3,530 *died at ages in excess of three score and ten.*

Irving Fisher's *Bulletin on National Vitality* shows this lengthening of human life present wherever civilization has reached its higher planes. He says that in England in the last quarter of the nineteenth century the average length of life was increasing at the rate of fourteen to sixteen years per cen-


·TEMPLE OF HEALTH·
FRESH AIR
GOOD FOOD
EXERCISE
REST
MODERATION
THE TEMPLE OF HEALTH IS FOUNDED ON MODERATION. ITS FOUR MAIN PILLARS ARE: FRESH AIR ... GOOD FOOD, EXERCISE AND REST.

Louisiana Almanac, 1916.

FIG. 4.

tury. In Massachusetts the rate of increase in the last half of the century was fourteen years per century.

Many false conclusions can be drawn from such figures; yet, after the application of proper corrective factors, it stands out that the average of human life is getting longer and an increasing number of people are living to a ripe old age.

This is because it deserves to be so. Occasionally you find an old rake

who is tobacco-soaked or whisky-soaked or obese and who boasts that he has consistently violated every law of health. A careful study of the heredity and life history of even these shows that "there's a reason."

The truth is that the right to a long life is being earned.

Then let us be merry.

CHAPTER II

The Nose

Most of the organs are built with plenty of leeway. Half of the kidneys could be removed, and what would be left could do the work without crowding. The heart pumps away, working under low pressure, and holding much more than half its power in reserve. The engine builders long ago told us that that was the best way to get wear out of an engine.

The nose does not measure up to that standard. It is unlike the other organs. It works on a narrow margin. If there is too much room, the air is not cleaned of dirt and germs and it reaches the large air tubes too dry and too cold. If there is too little room, not enough air can pass through and the mouth opens to allow the deficit to be made up.

The nose is the only part of the body that is infected a good part of the time. Besides the two main openings, one to the outside air and the other to the back of the mouth, there are seven openings into each side of the nose, or fourteen openings in all. Each of these openings drains some cavity, or was put there for the purpose of draining it. Some of the drains are habitually clogged.

One duct runs from the eyes into the nose. This duct is exceedingly necessary. The tears are needed to keep the eyes clean, and there must be a drain through which the wash can run off.

It is a large duct running from an open cavity, the front of the eye, to an open area, the nose. Down it there habitually flows a stream of fluid. This fluid is a good washing compound, one of the best. No widely advertised eye wash is to be compared with the tears as a wash.

Under these circumstances the tear ducts are seldom infected. Even when an infection travels to the eyes from the nose, or the other way, a few days of discomfort is the only harm.

The large duct keeps itself clean; also it keeps the upper cavity drained. We except the tear duct, or nasal duct, from our bill of complaint against the nose.

In the back of the nose, where it joins with the mouth to make the upper part of the throat, called by the anatomists the nasopharynx, there is an opening on each side. This is the opening of a duct which drains the middle ear. It is called the eustachian tube. It is a branch sewer, draining into the great sewer, the nose.

The middle ear is a small cavity on the rear side of the ear drum. There had to be a cavity there; it had to have air in it; it had to drain, and probably no better place was at hand than the nose.

Now, this little tube makes a lot of trouble. There is not much to drain down this tube, but it must be kept open to equalize the air pressure. This makes an arrangement that is subject to infection with air germs.

Bacteria of scarlet fever, of diphtheria, of ordinary sore throat, of ordinary colds, travel up this tube to the middle ear cavity.

When a cavity is right out in front, as is the eye, keeping it drained and

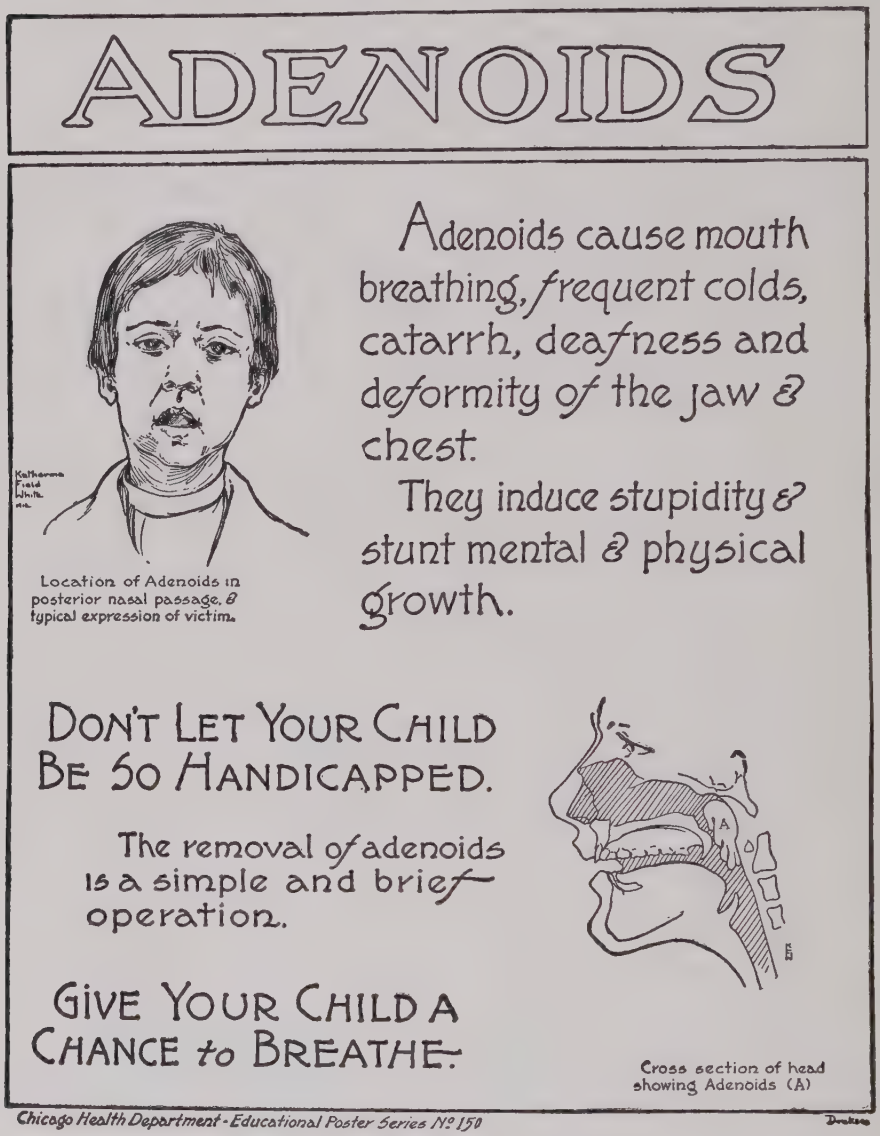

ADENOIDS
Adenoids cause mouth breathing, frequent colds, catarrh, deafness and deformity of the jaw & chest.
They induce stupidity & stunt mental & physical growth.
Location of Adenoids in posterior nasal passage, & typical expression of victim.
DON'T LET YOUR CHILD BE SO HANDICAPPED.
The removal of adenoids is a simple and brief operation.
GIVE YOUR CHILD A CHANCE to BREATHE.
A
Cross section of head showing Adenoids (A)
Chicago Health Department - Educational Poster Series No 150

FIG. 5.

cleaned is easy. When a cavity is stuck away up in the attic behind a curtain, as is the middle ear, keeping it clean, drained and free from infection is difficult. But at that, our bill of complaint against the nose must allow that the cavity had to be there and that it had to drain somewhere.

In addition, there are five other openings. Some are near-openings into

each side of the nose—ten in all. One of these drains is a cavity in the bones of the forehead just above the eyes.

Why there should be a cavity there nobody knows. It gives the overhanging forehead the beetling brow, but that does no good of which anybody knows.

A prominence in this locality is frequently held to indicate mental power. What it does mean is a hole in the head, and an easily infected one at that. So long as the hole was there it had to be drained, and about the most convenient sewer to empty the drain into was the upper front part of the nose.

Directly above the teeth lies another cavity in the bone called the antrum. The roots of the jaw teeth sometimes run up into this cavity. This cavity is below and just outside the nose. Being there, though nobody knows why, it had to be drained. So a delicate drain empties its contents into the nose.

Back behind the nose and somewhat above it lies another cavity, the sphenoidal sinus. Why it is there nobody knows. That space might have been filled in with solid bone without materially increasing the weight of the body.

The face might have been flattened in a little, doing away with the last two cavities—the antrum and sphenoidal—and in time we should have learned to admire the new type of beauty as much as we do the present type. Be that as it may, the cavity is there, and it had to drain. The duct empties into the nose.

Fig. 6.—Nasal Syringe.

Lodged away up in the attic are three cavities called the ethnoid cells. They are irregular in shape and size and they do not always have three openings that remain open. But those were the plans and specifications. The bill of specifications in our complaint against the nose contains several entries. As we should expect, these cavities, hard to drain, are frequently infected. There is no reason why infection cannot travel from the nose up these ducts.

The ducts do well enough as drains, as long as the amount to be drained is normal. But when inflamed or when the cavity wall is secreting pus, the drains do not work well. The sewer system clogs and the cellars overflow.

Wherever it may be, no suppuration tends to end unless the suppurating area can drain well. It is for that reason that white swelling keeps on running for so long; that hip joint suppuration is so chronic; that pus in the pleural cavity is so hard to heal.

When an ordinary cold starts the discharge is watery. In a few days it is pus. If the pus germs travel up these ducts and infect the cavity with a chronic suppurating process we have what is called catarrh. A great many people have catarrh.

As we expected when we found all of these nooks, corners and cavities leading off from the nose, we find troubles frequent. This faulty construction puts the nose on the sick list most of the time.

When the air enters at the front of the nose it is cold, dry and dirty. *If the nose were a tube with a plain, slick, smooth wall, the air would whistle through it without much friction, but it would reach the larynx cold, dry and dirty.*

In order to condition the air, three baffles are hung on the outer wall of each nose. They are long, bony curtains that hang down in the nose from above. These are called turbinated bones.

They had to be there to make things right, but their being there creates new fissures and nooks that do not clean themselves as well as a free surface should.

These turbinated bones and the membrane covering them can swell and shrink. If the air is dry and cold they fill up with blood, and, in consequence, swell. If the air is warm they contain less blood and are smaller.

The space in the nose is pretty closely adapted to the amount of air passing through. If these bones swell much or a polyp grows somewhere, or if the person becomes obese and fat is crowded into every loose place, breathing becomes obstructed.

The mucous membrane of the nose is lined by ciliated cells, just the type of cells best suited for a surface that must keep itself clean. In other words, the nose is a self-sweeper.

Now the air, as it enters the nose, is extremely foul. It contains much soot, dust, dirt, and germ life. The wet, warm, sticky surfaces remove most of this dirt, and the sweepers sweep it away. Some of it, however, fails to be removed. No sweeper is perfect in its action.

The dirt particles that get by the surface epithelium are picked up by the lymphatics. They are carried in the lymph stream to the nearest lymph node. Here they are stopped.

The first line of lymph nodes in the nose and upper throat is so highly important that each has been given a name of its own. The best known of these is the tonsil. The next best known is that gland of which the average person has heard, calling it the adenoid.

A BABY'S NOSE

A baby's nose consists of two holes in the face—a lick and a promise proposition. The nose of an adult is the most prominent and the most individual part of the face. No other organ changes so many hundred per cent from babyhood to maturity as does the nose.

A baby's brain is nearly as large as that of an adult, but a baby's nose does little more than mark the area to be given over to nose purposes. But the looks phase is the least important phase of the question.

The nose is the instrument of breathing. Its work is to convert the air as it is into air fit to be breathed.

The air must be warmed, moistened, and cleaned. This must be accomplished in a few inches of travel. The amount to be passed through is large, and the time is short.

The nose must be just right—not too large, not too small, with plenty of cleaning surface, and not too much. A distinguished writer holds that the reason negroes cannot stand cold weather is because of the fact that their noses flare out and the air is not properly conditioned before it gets into the lungs.

The usual difficulty is that the nose is too small, and there is not enough

air room. For this there are several reasons. Sometimes one is present and sometimes another.

Adenoids and enlarged tonsils in children narrow the nose space. The child breathes through its mouth, and the nose, unused, does not develop normally. The upper jaw does not spread from side to side as it should; the roof of the mouth arches up and shuts off some of the nose space.

The midbone of the nose, called the septum, is set on the upper side of the roof of the mouth, and, as the roof arches up, the septum crumples up somewhat like an S. When the side bones grow out to moisten, warm, and clean the air, not much space is left for the air to pass through.

What's to be done about it? Several things. Clean out the adenoids and tonsils, when these are enlarged and obstructing. Stop children from sucking their thumbs, or pacifiers, or nipples—habits which narrow the upper jaw, raise the roof of the palate, and narrow the nose space.

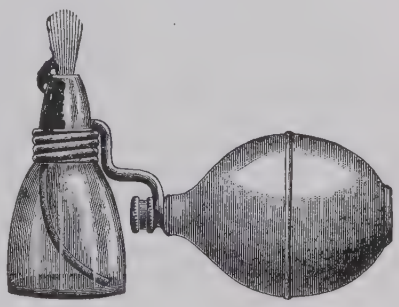


Fig. 7.—Atomizer for Spraying Oils.

For your children do everything possible to stimulate the growth of a large, bony frame and a strong mass of muscles. See that there is plenty of play with its consequent deep, full breathing, and correct mouth breathing.

Until the youth has reached about twenty-five it is easily possible to spread the upper jaw, drop the arch of the roof, and thus increase the nose space. This is done by jackscrews pressing the sides of the upper jaw apart.

After twenty-five not much can be done. Cutting off spurs, straightening the septum, and removing turbinates help a little. The real remedy is to see that the upper jaw is broad enough and the mouth roof low enough in childhood and youth.

Chronic Nose Infection.—*L. K. A. writes: "I have been troubled for years with a hawking and spitting of thick mucus, sometimes very dark. I am well and strong and breathe through nose and sleep with window open. I catch cold easily, but never have sore throat."*

Reply.—The color results from dust and smoke in the air breathed. That feature is of no consequence. You have a mild chronic infection in your nose or throat. It probably will never do you much harm. You may get along just as well if you keep your nose and throat clean and let it go at that.

Have Your Nose Examined.—*C. A. M. writes: "I seem to have trouble with my nose, especially one side. A dull feeling is felt on that side, which feels as though something was pressing against the bone. I am always clearing my throat, which is very disagreeable. I've been spraying my nose with a salt solution, which helps, but only for the time being. Do you think I ought to see a physician, or could I help myself in any way?"*

Reply.—Have your nose examined and proper treatment given.

Mouth Breathing Dangerous.—*S. B. J. writes: "I have lately fallen into the habit of sleeping with my mouth open. I sleep on the right side—never on the back. Is there any way in which this habit can be corrected?"*

REPLY.—Mouth breathing is the stepping-stone from minor diseases and obstructions in the nose to more serious diseases in the chest. It may sometimes persist after the obstruction in the nose has been removed. It is rarely due to habit only. If you are unable to breathe through the nose, an obstruction is present which should be removed. Have this looked into.

Chronic Nose Trouble.—*A. G. J. writes: "I am troubled with pain in my shoulders and chest, and I spit blood occasionally. I have been treated by a specialist for catarrh. Do you think the bloody sputum comes from that? I have been examined by four different doctors and they all said my lungs are in good shape."*

REPLY.—Yes. I assume by "sputum" you mean bloody nose and throat secretions. Such bloody secretion does not mean consumption. On the other hand, it could come from a chronic nose trouble.

Obstructed Nostrils.—*O. M. O. writes: "During the rainy seasons of the spring and fall I am afflicted with a sore chest and stoppage of the nose. What course should be followed out that will serve to remedy this?"*

REPLY.—If your nose stops up it is because the air passage is too narrow. You may have polyps. You may have enlarged turbinated bones growing into and filling up the air space. Neither of these conditions is remedied by medicines. Go to a specialist and if obstructions are found have them removed.

Mouth Breathing.—*I. V. W. writes: "What is the most effective way to overcome the habit of breathing through the mouth at night? During the day I have no trouble breathing through my nostrils, but at night, on retiring, it seems I cannot get enough air through them."*

REPLY.—You should have a nose specialist remove the obstruction from your nose. In some cases, harness to keep the mouth shut suffices, but the cases are few. It is usually a question of breathing room.

Harm of Mouth Beathing.—*B. W. I. writes: "Does a mouth breather contract a cold more readily than a nose breather? Does mouth breathing do any other harm? How can it be overcome?"*

REPLY.—1. Yes.

2. Increases infections of the lungs, bronchi, and throat other than colds. Increases infections of the glands of the neck. Changes the facial expression in children. Causes snoring. Disturbs sleep somewhat.

3. Remove the obstruction.

Cause of Mouth Breathing.—*T. H. B. writes: "Is it injurious to breathe through the mouth while asleep? Is there a preventive?"*

REPLY.—It is. The nose has been devised as the best possible breathing channel. Breath taken in through the mouth is not warmed and cleaned as well as it should be. Among other things, mouth breathing leads to adenoids, enlarged tonsils, and enlarged glands. To sleep on the side helps; to sleep in a cold room helps; to remove bony obstructions in the nose helps. There are devices for keeping the mouth closed at night.

CHAPTER III

The Tonsils

The tonsils are in the back portion of the mouth; the adenoids are higher up, being behind the soft palate. The lymph nodes are there to stop foreign bodies and prevent them from getting into the blood stream. As the first breastworks they are excellently placed.

The air route (the nose, pharynx, larynx, bronchial tubes) crosses the food route (mouth, pharynx, esophagus) at the back of the mouth (the fauces).

This part of the tube serves a double purpose. It is a single-track stretch in a double-track system. It is as though an electric line crossed a steam line, and for a few miles the two services ran on a single track.

Since this piece of track (the pharynx) is to serve also as a food track, it cannot be lined with the delicate, wavy, ciliated cells found elsewhere in the air track. It must be lined by flat epithelium cells adapted to pressure.

As it carries air containing dirt and bacteria and as flat cells are not as efficient air cleaners as the ciliated kind, infection would be exceedingly liable to get through at this point, and to provide against it a breastwork of lymph tissue, called the tonsils, has been thrown up.

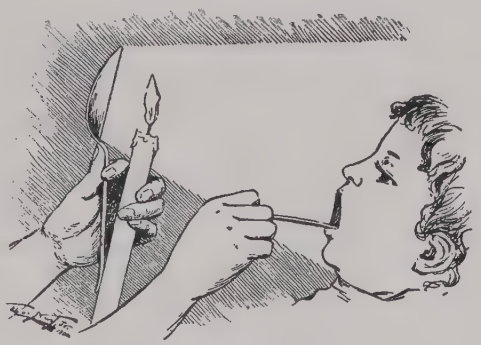


FIG. 8.—THROAT INSPECTION.

Unfortunately, the tonsils contain one structure in addition to the lymph nodes. On the surface are ten to twelve deep pockets, called crypts. The crypts are about one-third to two-thirds of an inch deep.

There are many theories as to these crypts. Some think that bacteria grow in them; that they act as test tubes and that the toxins being absorbed constantly in time make one immune; in other words, that they do good.

Being deep, narrow, blind pouches, they do not easily clean themselves. In fact, they are extremely apt to fill up with decomposing epithelium bacteria and remnants. Such are the little, round, offensive balls which some people find at times in their mouths.

In recent years physicians have found pneumococci, or one of the pus cocci, in these crypts in many cases of rheumatism and rheumatic arthritis.

There are those who think the tonsillar crypts serve as a purpose and others who think they do harm. I think the best arguments are with the

latter group. In filing specifications to a bill of complaint, I think we should include the tonsillar crypts.

There is much controversy over the lymph gland portion of the tonsil. Some think it helps to make blood; others that it protects the body against disease; others that it helps in other ways.

On the other hand there is a large group which thinks the tonsil serves no good purpose at all, whether well or sick.

In a discussion before the staff of Mount Sinai Hospital, Dr. Freedman summarized his views with this sentence:

"Removal of the tonsil does not remove from the body any organ or tissue absolutely necessary to the system, but, if not diseased, its removal has left the individual with one defense less."

If a foreign body gets by the lymph tissues in the tonsil, it still has to pass through some glands in the upper part of the neck below the angle of the jaw. If it gets by these it has to run by a third barrier, deeper and lower down in the neck.

It happens that infections frequently get into the system through the tonsils. Some, referring to this, have called it a portal of entry. Some have said that the tonsil is put there to absorb.

The view held by the better physicians is that the mouth and nose are great portals of entry and that the tonsils stand there, as Goodale says, as "sentinels of the body." In their effort to protect the body they frequently become inflamed.

Freedman says: "When an infection enters through the tonsils, there is great likelihood that the tonsil attempts to overcome the invader, and, failing in this, the next lymph glands in order of defense take up the battle. *However, if the tonsil is so diseased that its ability to cope with an infection is so far reduced that on very slight provocation it becomes inflamed and too frequently in the battle between it and the invading bacteria it becomes the loser, so that constitutional symptoms intervene, it is then fair to presume that no longer is it a sentinel, but rather an obstacle of defense and may then actually serve as a portal of entry for disease."*

This, put in another way, means that if the teeth, nose and tonsils can be put in good condition; if the tonsils do not often become inflamed, and if they do not interfere greatly with breathing, they should not be removed. Under these circumstances they help to protect against infection.

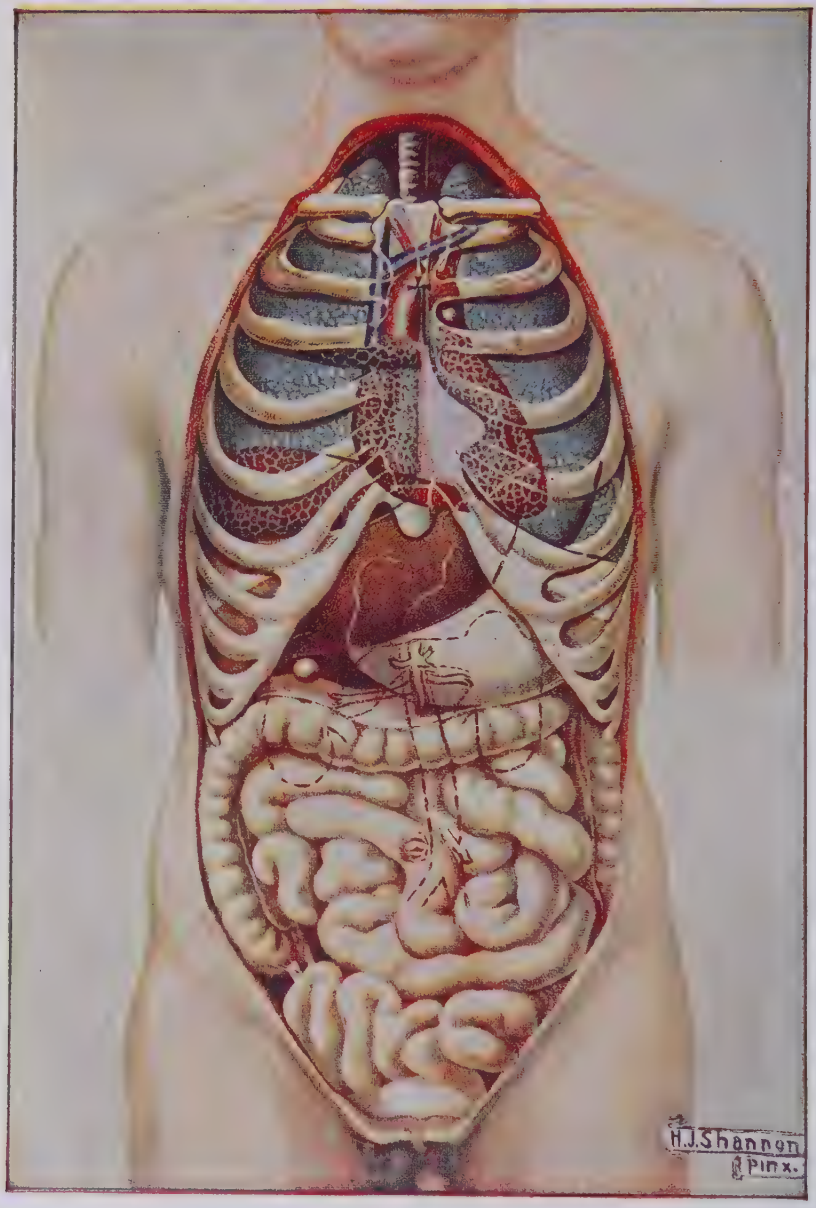
If attacks of tonsillitis are frequent, if the tonsils are enlarged chronically, if they cannot be kept clean, then they should be removed.

In a certain sense tonsils can be outgrown. Tonsils enlarged enough to interfere with breathing in children in time may get much smaller. Good judgment is required to decide which cases can be left to outgrow their trouble.

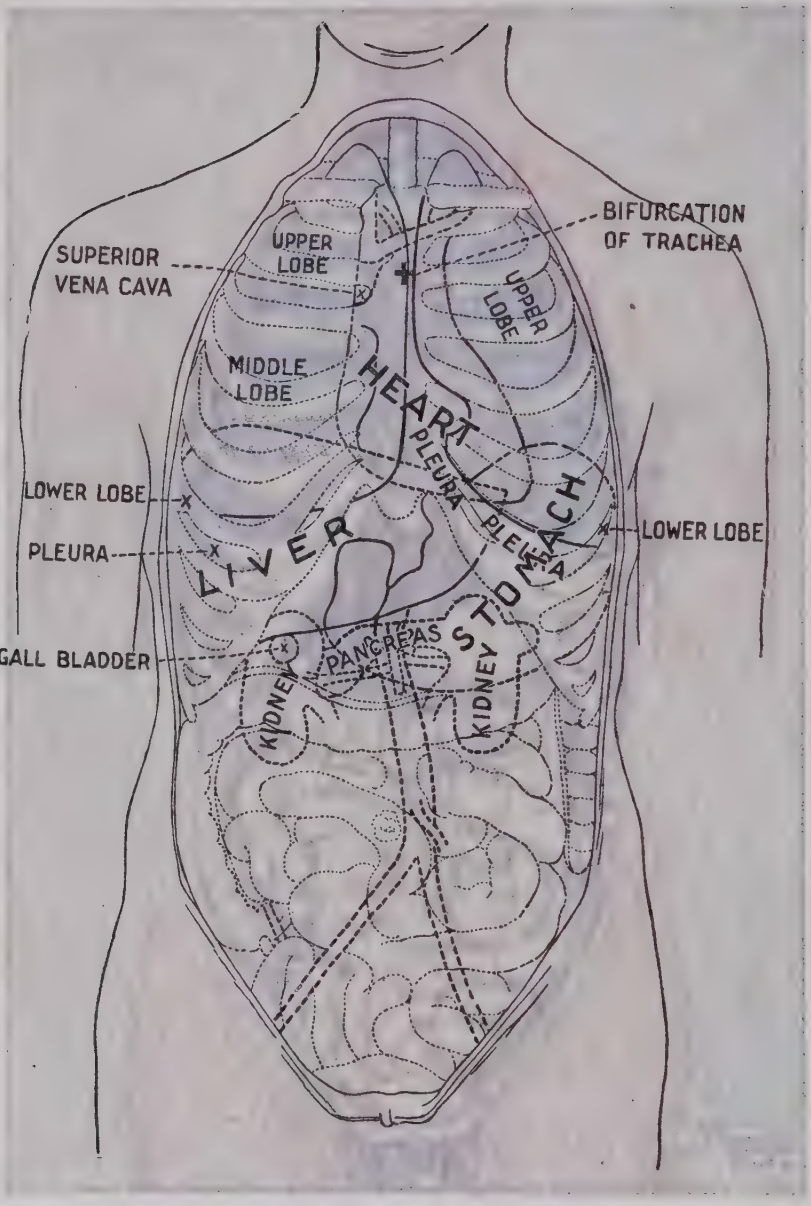
KEEP TONSILS CLEAN

When inspection shows the tonsils and adenoids enlarged, when the history records frequent sore throats and colds, and occasional earaches, the doctor is called upon to decide whether the enlarged structures should or should not be removed. After a gland has been swollen for some time, has

PLATE I.



THE SHAPE AND RELATIONS OF THE THORACIC AND ABDOMINAL VISCERA,
ANTERIOR ASPECT (SEMI-DIAGRAMMATIC)


BIFURCATION
OF TRACHEA
SUPERIOR
VENA CAVA
UPPER
LOBE
UPPER
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HEART
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LIVER
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GALL BLADDER
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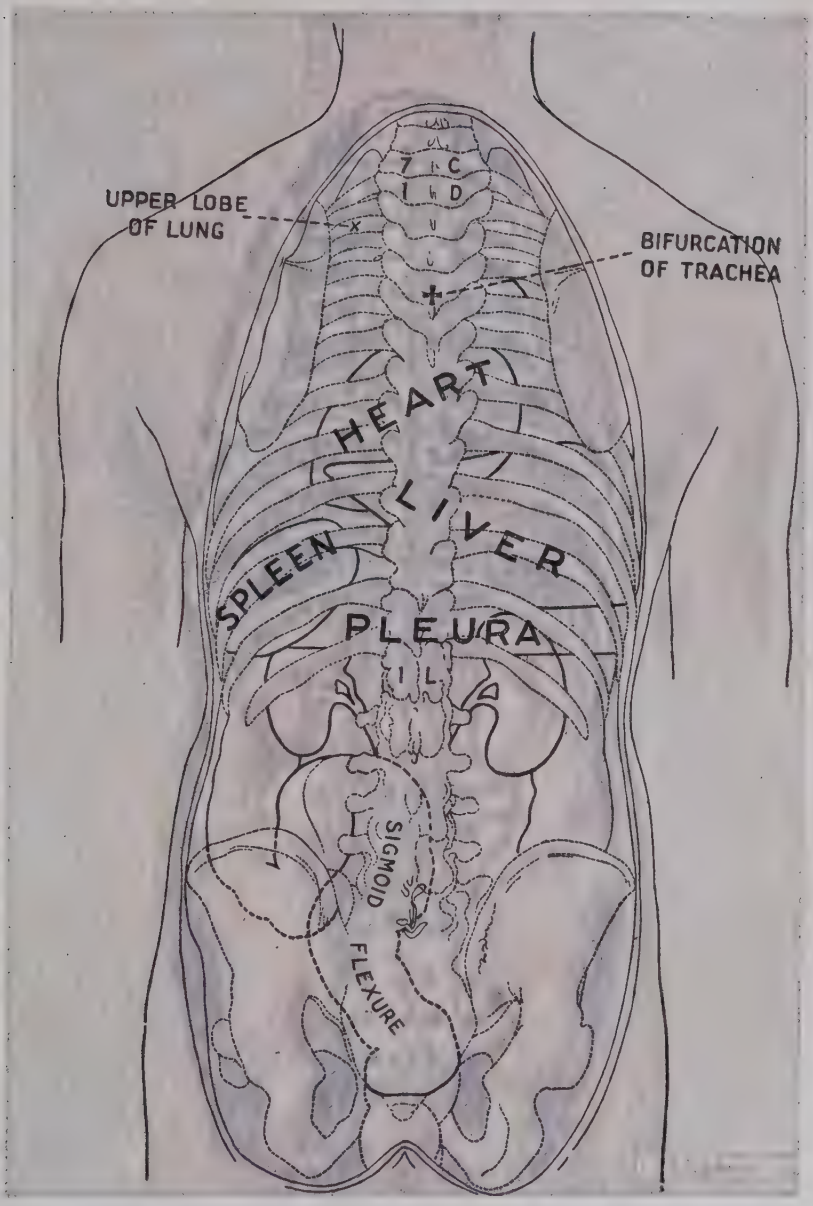

UPPER LOBE
OF LUNG
BIFURCATION
OF TRACHEA
HEART
LIVER
SPLEEN
PLEURA
SIGMOID
FLEXURE

PLATE II.

THE SHAPE AND RELATIONS OF THE THORACIC AND ABDOMINAL VISCERA,
POSTERIOR ASPECT (SEMI-DIAGRAMMATIC)

been soaked in poison for a long time, it is a different structure from the normal gland with which the body was originally endowed. It has become like a befouled filter, befouled from the liquids that filter through it.

We must not forget, however, that when we are considering the tonsils and adenoids we are not yet at the source of the stream. The man who studies the Mississippi at St. Louis is nearer the source than the one who studies it at New Orleans, but he is still far from the source. If he were trying to find out the source of high water he must get information about melting snows in Montana or rains in Ohio.

The tonsils and adenoids stand at one gate; behind them lie the ears, the lungs, the joints, the blood stream. When they are diseased it is because they are doing their best to protect the structures which lie behind them from the pollution which lies in front of them.

One of these fields of pollution is the teeth. The dentists tell us that we should clean the teeth every day as well as we can, and that several times a year we should go to a dentist for a complete cleaning. That is good sense.

Some of us follow it. Unfortunately, the grown people follow it better than the children, while, unfortunately, the children need to follow it more than do the grown people.

The mouth cleans itself well with the exception of the teeth, the upper surface of the tongue and the tonsils. The tongue can be washed, and, when necessary, scraped with the edge of a spoon.

FIG. 9.—LOCATION OF GLANDS WHICH FREQUENTLY ENLARGE. CAUSES OF ENLARGEMENT: 1. Disease of the ear. Eruptions about the face. 2. Eruption of the scalp, mastoiditis. 3. Infections of the chin, tongue and lower lip. 4. Infections of the mouth and teeth. 5. Infections of the tonsils. 6. Pharyngeal infections. 7 and 8. Infections of the scalp and pharynx. Tubercular infections are especially frequent in 7 and 8. Diphtheria in 4, 5, 6, 7 and 8. Scarlet Fever in 5, 6 and 7.

I think the tonsils should be systematically cleaned. A cleansing gargle, used each morning, is of some service. Various instruments for cleaning the crypts have been devised. Some empty by suction, others by pressing. I understand that none of these is wholly satisfactory at present, but when periodic visits to the throat man are as customary as periodic visits to the dentist, the former will perfect his appliances for cleaning the crypts of the tonsil.

Absorption from the nose is largely responsible for swelling of the adenoids. Snufflers are most subject to adenoids. The first inch of the nose is easily cleaned. A piece of cotton and some boracic acid solution (68 grains to one pint) will suffice to clean this portion of the nose.

To cleanse the deeper parts many use sprays and douches. As to this custom I have my doubts. The secretion of the nose is a good wash, and probably all that is required for a normal nose.

Has Tonsil Trouble.—*A. M. writes: "I have tonsil trouble. I wish to have the tonsils cut out, but friends advise me not to, for the reason that the lungs will be exposed to dust and dirt. Will you please advise?"*

Reply.—If the tonsils are in good condition they protect the remainder of the body. If they are much diseased they do not. Therefore, if your tonsils are much disordered have them out.

Keeping Tonsils Clean.—*G. H. writes: "I notice you suggest putting the nose, teeth, and tonsils in order and keeping them clean as a preventive against rheumatism. How would you do this?"*

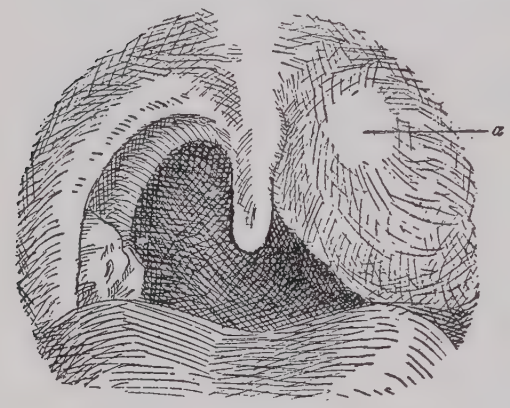


Fig. 10.—Peritonsillar Abscess.

Reply.—Some people can cleanse their tonsils by massaging with the finger or with some blunt instrument—for instance, the end of a spoon handle. This should not be done oftener than once a week, and usually it will not be necessary to do so often. Others must have it done for them.

Effect of Infected Tonsils.—*Reader writes: "Will you please tell me what evil effects are apt to come from infected tonsils? Could they cause a bad breath?"*

Reply.—Mouth breathing, enlarged neck glands, pallor, frequent sore throat, deafness, sometimes tuberculosis. As to bad breath, yes.

Tonsillar Crypts.—*C. E. R. writes: "Are the white, cheesy particles which form in the crypts of tonsils infectious? And should tonsils having these crypts be removed to prevent poisons going through the system?"*

Reply.—These cheesy particles are composed of bacteria, decomposing epithelial cells, and food remnants. They may contain pus germs and tubercle bacilli. They are partly responsible for enlarged glands in the neck and what used to be called scrofula. If they can be removed easily by the patient or his physician and are so removed from time to time, the tonsils need not be cut out. If these masses form and are not removed the tonsils should be cut out.

Keeping Crypts Clean.—*T. L. writes: "Please tell me how the tonsil crypts may be kept clean."*

Reply.—Washing with tooth washes will suffice for surface accumulations. Accumulations in the crypts can be squeezed out by going over the tonsils with a loop made of smooth wire. Some can do this for themselves; others must have it done periodically by their doctor or dentist.

Does Not Weaken Lungs.—*Miss F. writes: "As I am troubled with tonsillitis, getting it every year, sometimes twice, I would have you advise me whether this indicates that my tonsils are diseased. What are diseased tonsils? Would having them removed make the lungs weak? Many people advise me not to have them removed; others think it beneficial."*

REPLY.—That you have tonsillitis once or twice a year does not necessarily mean that your tonsils are abnormal, or that they should be removed. If they are large and boggy, have crypts that fill up with débris, or if you have quinsy once or twice a year, they had better be removed. In other words, decide the question on the basis of the condition of your tonsils. Get the best advice available, and follow it. Removal of the tonsils does not make the lungs weak.

Developing the Lungs.—*D. W. writes: "Please give directions for a mode of life which will tend to develop strong, healthy lungs in a child. The child's father at one time had pulmonary tuberculosis."*

REPLY.—The best way to develop the lungs is to develop the legs. Keep the child in the open air as much as possible. See that the nursery is well ventilated and that the temperature there is kept low. Be on the watch for the perfection of a method immunizing against consumption. It should come before long.

Fresh Air Counts.—*H. W. H. writes: "I sleep upon a sleeping porch, but am afraid that I do not get the benefits of the fresh air, because when sleeping I breathe through the mouth. A chin truss is said to make nose breathing necessary, cure colds, throat troubles, etc. Do you consider it a good thing? If not, could you tell me any better method? Also, could you advise me on this point? I wish to get 'fattened up,' and have a chance to get both filtered, artesian water, and fresh, pure, cow's milk—as much as I want of either. Having heard both the 'milk diet' and 'plenty of fresh water' recommended highly, I am undecided which to adopt. Which is more fattening? When I have adopted one, should I cut the other one out entirely?"*

REPLY.—1. It is the fresh air that you get into your lungs that counts. The air you fail to get is of no value to you. Mouth breathing does not allow the air to enter the lungs freely. Another disadvantage is that air taken directly through the mouth is not properly warmed, moistened, and filtered. Mouth breathing is caused by some obstruction in the nose or the pharynx, an overgrown bone or a foreign growth in the nose, enlarged tonsils, or adenoids in the throat. To stop mouth breathing, these should be removed. Rarely, mouth breathing persists as a habit for a short time which can be easily overcome by letting the nose go ahead with its work and keeping the mouth shut. I have no faith in the chin truss cure-all and do not recommend it.

2. Good water and pure milk are both good things. To "fatten up," something is needed besides. Plenty of good simple food, exercise in the open air, and a cheerful disposition will help considerably.

CHAPTER IV

Adenoids

There are at least six tonsils. The two large ones on the side of the throat back of the palate are known as the faucial tonsils. When the word tonsil is used, it is these large masses, the faucial tonsils, that are referred to. In addition there are four other tonsils, and the six together make a picket line called Waldeyer's ring. They are also called adenoids.

In Waldeyer's ring is a defensive line of filters, dotted around the field much after the fashion of the players on a football team when the opposing team kicks off. One of these, called the lingual tonsil, is located on the back of the tongue. Two, called the eustachian tonsils, are located at the mouths of the tubes that run to the ears. One is at the back part of the roof of the nose, near the point where the air route turns down to cross the food route. This tonsil is usually called the pharyngeal tonsil. When we say that a child has adenoids, we generally mean that this tonsil is enlarged.

This is a most important tonsil. It is frequently found large. When it is large, it shuts off the breathing space; the child becomes a mouth breather. Mouth breathers catch cold easily; they catch scarlet fever and diphtheria; they are "catchers."

In mouth breathers the roof of the mouth arches up; the nose space is lessened, and the teeth do not meet properly.

These conditions are so important that it is good judgment to remove adenoids that swell and stay swollen. They are diseased, and, therefore, are not up to standard as filters. We know that a foul water filter increases the foulness of water that passes through it. The same filter, properly cleaned, cleans the water that passes through it.

It is good judgment to remove adenoids that swell and stay swollen, because they stop up the nose, befoul the mouth, increase infection, all by bringing about mouth breathing.

The adenoid swells because it is doing an extra amount of filtering, which means that it is swelling because the nose is dirty. If the nose is kept clean and the air breathed is kept moist, tempered and clean, the adenoids will not enlarge.

A large proportion of those enlarged would shrink up if the nose were cleaned and kept clean, and if the atmosphere of the schoolroom and home were made right.

CLEAN MOUTHS AND INFECTION

Physicians find that a large portion of the school children need to have their tonsils and adenoids removed. Nearly all the infections which children have, and most of those which adults have, get in through the mouth and nose.

Tonsils and adenoids are put in the nose, mouth, and throat because they are needed to keep infections from getting into the blood, brain, lungs, or other tissues, where they can do more harm than in the tonsils.

Healthy tonsils and adenoids should not be removed. Those that are enlarged and swollen should be. Not one-half of the tonsils are removed which should be removed.

Diphtheria infection may locate on the gums, the nose, or the tonsils, or in any one of several places. Diphtheria located on previously healthy tonsils requires less antitoxin, is more easily cured than diphtheria anywhere else. The reason is that tonsils help to protect the tissues which lie beyond. The point is that we should go back of the tonsils and thus try to keep them healthy.

If the mouth, nose, teeth, and fold of the tonsils are kept clean the problem is solved. The tonsils will not enlarge.

The teeth should be picked, washed, and brushed several times each day. Periodically a dentist should give them a more thorough cleaning. The mouth and tongue should be washed as frequently and as thoroughly as the hands. Periodically a physician should clean the tonsil crypts. There are those who systematically wash the nose.

North Carolina Health Bulletin, Feb., 1913.

FIG. 11.—HEADQUARTERS FOR GOSSIP AND GERMS.

The human mouth is fearfully dirty. The wonder is that any tonsils escape enlarging. Is there any reason why we should have clean hands and faces and dirty mouths?

Cause, Prevention and Treatment of Adenoids.—*E. D. W. writes: "1. What causes adenoids in a child of 6 years? 2. What precautionary measures should be taken by parents to prevent the development of adenoids in a child? 3. Will adenoids disappear in time, if they are let alone? 4. If an operation is deemed necessary in case of adenoids, is it such an important matter that an expert surgeon should be employed, or will any family physician be competent to remove them? 5. How are tubercular glands of the neck to be cured?"*

REPLY.—1. Absorption of germs and their products, and of decomposing matter from the tonsils, teeth, mouth, and nose.

2. Keep the mouth, teeth, tonsils, and nose clean from babyhood up. Keep the child in the open air. Keep him free from colds. Some children have an inherited tendency to lymph gland overgrowth. These must be better watched than the general run of children.

3. Yes, many cases will. In most cases, however, the child is a confirmed mouth breather, and his constitution is irretrievably gone before the adenoids go.

4. A nose and throat specialist is generally best. Some family physicians can operate successfully on such cases.

5. Tuberculin tonics, open air, feeding, attention to the absorption areas —tonsils, teeth, mouth, nose.

Dryness and Adenoids.—*Reader writes: "Will you kindly inform me if it is unhealthy to live in a cement house that has waterproof coating on the outside? The house seems to be too dry, especially in winter. Can such a house be kept moist in any way? Can too dry a house cause adenoids in children?"*

Reply.—1. The house you have in mind is not unhealthy because of the cement walls, but because, in heating it, you have fed heat and not water to the air. Whenever one feeds heat to air he must also feed moisture; otherwise there is trouble. If a cement wall house is unhealthy it is because the walls are snug and heat cannot readily pass out.

2. Yes; evaporate enough water in connection with the heating system.

3. Yes; it is the most frequent cause.

Removal of Adenoids.—*G. S. K. writes that she has been told I do not advise the removal of adenoids and tonsils. Is this true?*

Reply.—My contention is that, if the mouth, teeth, and nose are kept properly clean from infancy up, tonsils and adenoids will seldom require removal. When the tonsils swell, sometimes the contents can be squeezed out of the small cavities, and removal is not necessary. When these stages have passed, there is nothing left but removal. Removal is not done in fully half the cases in which it should be.

See Throat Specialist.—*E. G. C. writes: "Kindly give me your advice in regard to the removal of adenoids. A little girl of four has adenoids. They do not trouble her, but she sleeps with her mouth open."*

Reply.—I am inclined to think a throat specialist will advise their removal. Sleeping with the mouth open is easily recognized. There are other results from mouth breathing not so easily recognized.

SNORING

When the currents of the air cause the soft palate to flutter, a snoring sound is made. This may happen when the mouth is closed. It is much more likely to happen when some of the breath is coming through the nose and some through the mouth. It may occur when the mouth is closed and nothing is the matter with the nasal passageway.

The tendency to snoring, however, is increased by obstruction of the nasal airway. During sleep the muscles of the body are relaxed. For this reason, when one lies on the back while sleeping, the tendency is for the mouth to open. Therefore, grown-ups who sleep on their backs usually snore more or less.

When one snores it is usually because the nasal airway is not large enough. There may be a crooked septum in the nose. There may be spurs of bony substances partially closing the nasal cavities. There may be enlarged

turbinates, diseased sinuses, polypi, or adenoids, which prevent free passage of air through the nasal openings.

There may also be an undue smallness of the nares, or a tendency of the soft parts of the nostrils to collapse during inspiration. Too much fat along the air route, in the abdomen, or in the chest wall, may be the cause of the embarrassed breathing.

The habit of snoring is difficult to cure. Abnormalities and diseased conditions of the nose and throat act as a contributing cause. They should be corrected.

In many cases it is necessary to straighten a crooked septum, remove growths—adenoids, polypi, and spurs. It may be necessary to remove diseased tonsils.

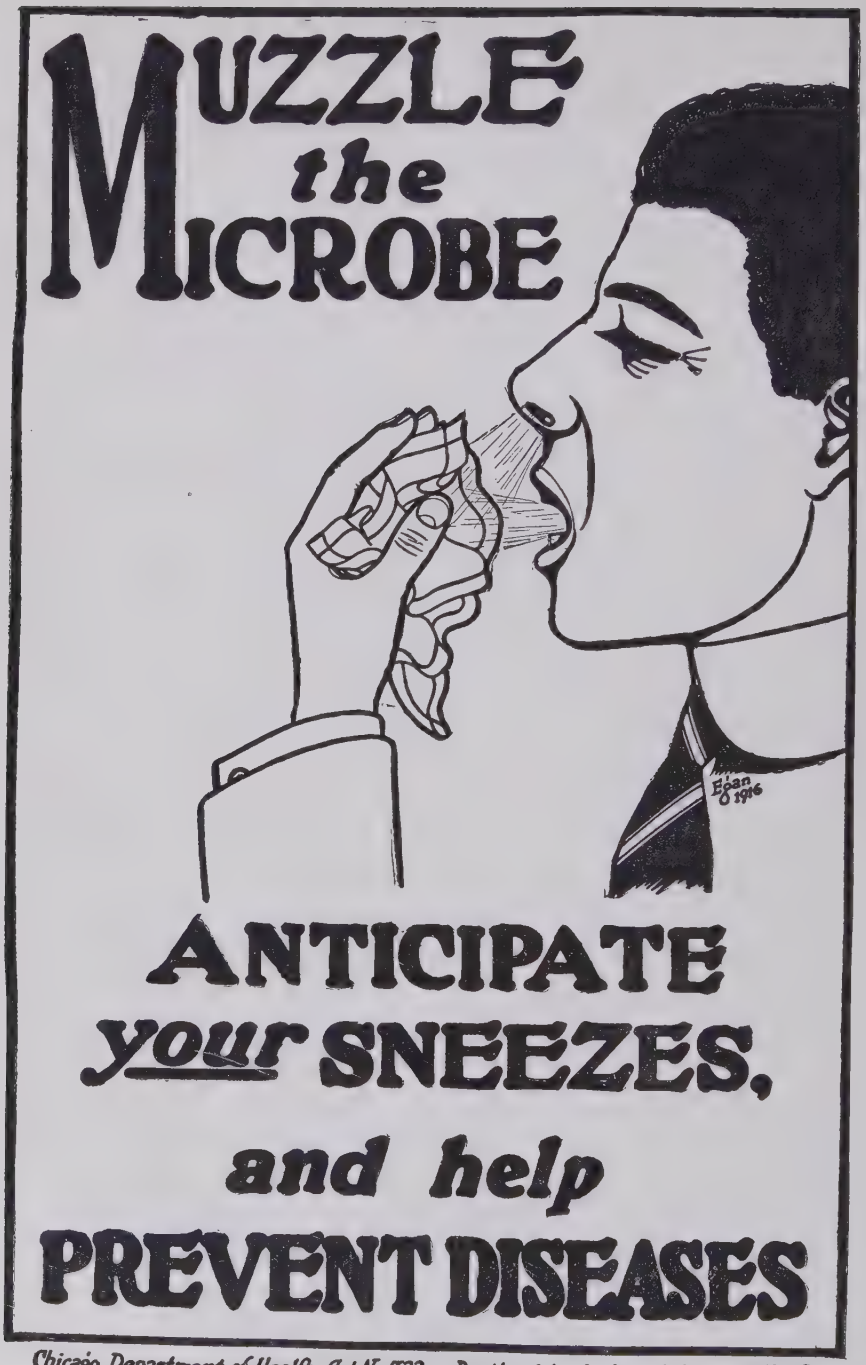
Inflammation involving accessory sinuses and tonsils must be cleared up before the habit of snoring can be easily overcome.

Snorers should sleep on their sides. In this position the mouth is less likely to drop open. Various mechanical devices have been suggested for holding the lower jaw closed. A harness arrangement, extending about the head and under the jaw, has been advised.

It has been suggested that holding pieces of muslin or cheesecloth between the teeth and lips would assist in controlling the habit. The presence of foreign substances between the teeth would no doubt sufficiently impress the subconscious operation of one's mind to such an extent that he would keep his mouth closed. The presence of the foreign substance in the mouth keeps the mind on the substance even when asleep. The sleep in this case is as restful as when snoring.

Cause of Snoring.—*J. P. K. writes: "You will perhaps recall when Theodore Roosevelt was in a local hospital recuperating from the Milwaukee shooting he snored so loudly that it was heard in the entire ward. Now T. R. is a 'physical marvel' and I wish to inquire if this snoring is preventable or not. I know an open mouth has nothing to do with it. I have put a sealing plaster across my lips on retiring and found it intact in the morning, yet my wife said I snored just as badly."*

Reply.—Snoring does no harm. That is, it does you no harm; it may prevent the "missus" from sleeping. It is due to flapping of the palate. When two currents of air, one through the nose and one through the mouth, meet at the edge of the palate, this pliable curtain flaps back and forth. Occasionally a person will snore with his mouth closed. In that event little or no harm results. The harm of snoring results from the mouth breathing—the taking into the tubes of air not properly warmed and moistened. Mouth breathing in grown people makes them more liable to colds, and that is about all. It is more harmful in children. Snoring in grown people is of some consequence because it indicates that the breathing space is pretty near the limits of comfort and safety—the nose is not roomy enough or the individual is getting too fat.



Chicago Department of Health · Cut No. 322 · Designed by Arthur M. Corwin, A.M., M.D.

FIG. 12.

CHAPTER V

Colds—Catarrh—Sore Throat

COLDS

COLDS A LUXURY, NOT A NECESSITY

President Emeritus Eliot, in his address before the American Philosophical Association on "Benjamin Franklin as Printer and Philosopher," quotes that American scientist as saying:

"People who live in the forest, in open barns, or with open windows do not catch cold, and the disease called 'a cold' is generally caused by impure air, lack of exercise, or from overeating.

"I have long been satisfied from observation, people often catch cold from one another when shut up together in close rooms and coaches and when sitting near and conversing so as to breathe in each other's transpiration, the disorder being in a certain state."

Says the naturalist, John Muir: "As long as I camp out in the mountains without tents or blankets, I get along very well, but the very minute I get into a house and have a warm bed and begin to live on fine food, I get into a draft and the first thing I know I am coughing and sneezing and threatened with pneumonia, and am altogether miserable."

Says Irving Fisher: "Personally, I have known of scores of cases in which the tendency to catch cold has been almost completely overcome." After reciting some cases, he says that if outdoor life had been adopted simply as a preventive of colds, it would have prevented, originally, as it cured subsequently, their more serious disorders.

Gulick is inclined to believe that something like nine-tenths of all the minor ailments that we have and which constitute the chief source of decreasing our daily efficiency could be removed by careful attention. "With the removal of nine-tenths of our disabilities and the conservation and further development of our natural powers, the average person can increase his efficiency one hundred per cent, that is, he can be twice as effective."

The things which need to be done are:

1. Sleeping and living in cool, well ventilated rooms.
2. Eating moderately.
3. Keeping the secretory organs working properly.
4. Building up resistance by cold baths, air and water, and exposures within reason.
5. Keeping the mouth and nose clean.
6. Keeping away from infectious people, sick and well.

To do these six things perfectly means absolute freedom from colds. To

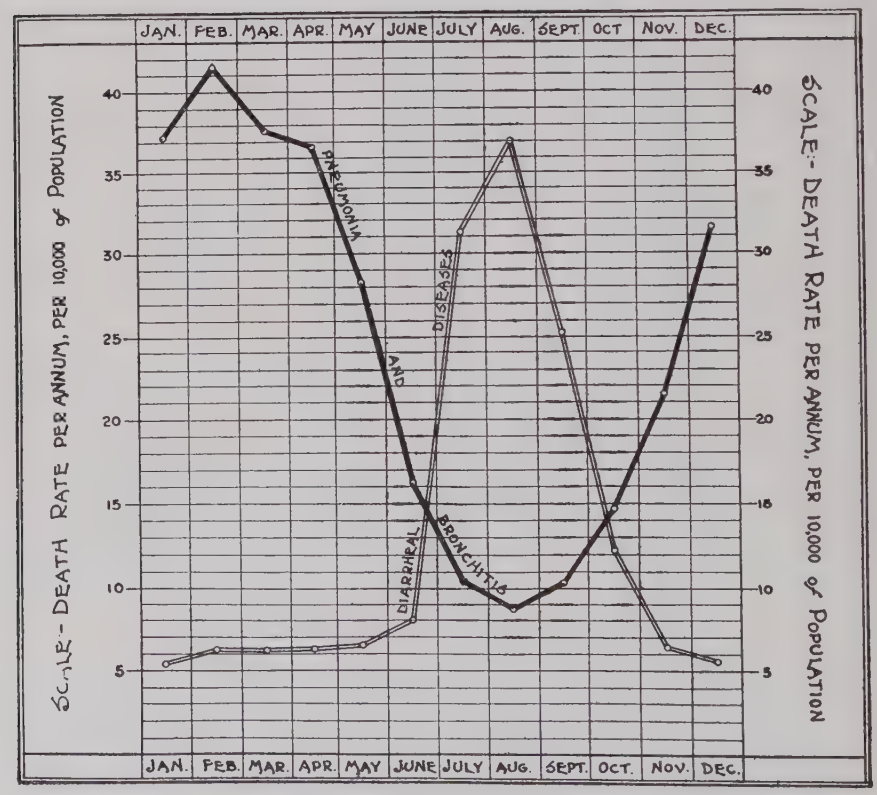
"THE DOUBLE CROSS"

THAT THE IMPURE-AIR AND THE IMPURE-FOOD DISEASES GIVE CHICAGOANS.

MONTHLY DEATH RATES FROM TWO GROUPS OF DISEASES THAT ARE INDIRECTLY AFFECTED BY WEATHER CONDITIONS.

IMPURE AIR DISEASES—Pneumonia and Bronchitis—HIGH in Winter when people house themselves up and breathe the foul air of unventilated rooms. LOW in Summer when people keep their doors and windows open; when people live more in the open air.

IMPURE FOOD DISEASES—Diarrheal Diseases—HIGH in hot weather chiefly because heat spoils; or flies, dust, etc., contaminate the food we eat—ESPECIALLY BABY'S FOOD.



Chicago Health Department.

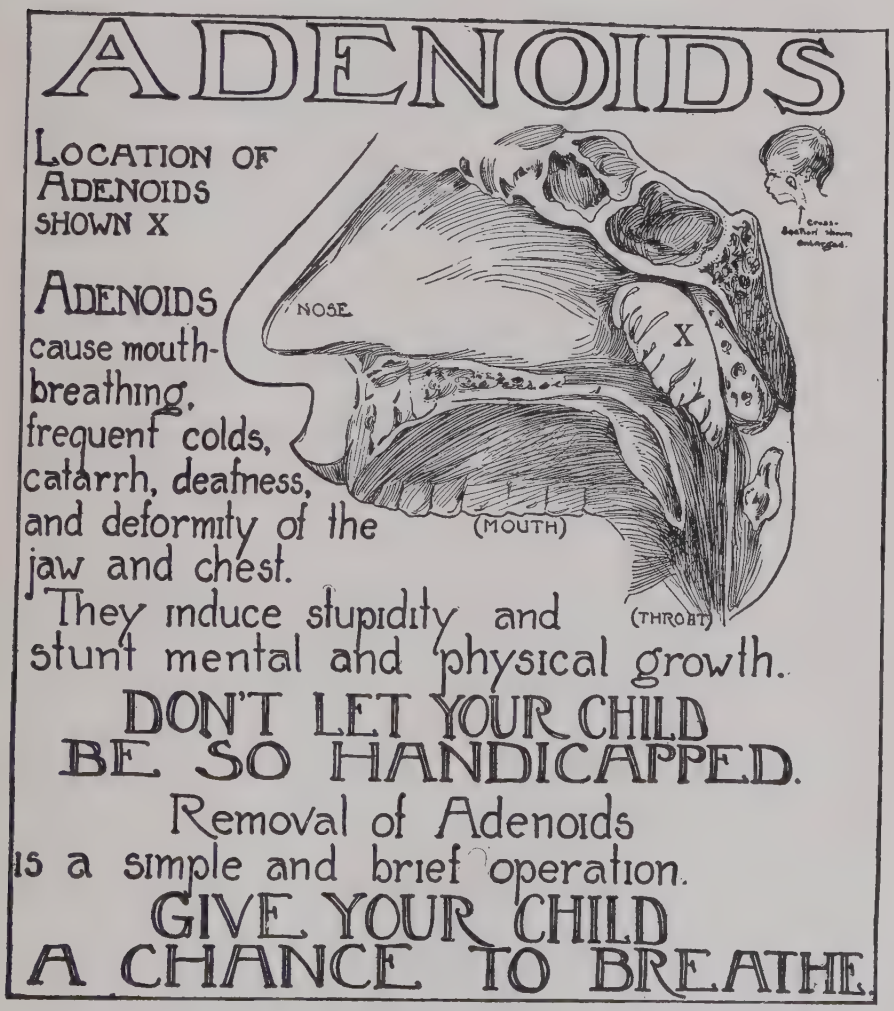
FIG. 13.

do some of them and not do others, reduces the number of colds, though the reduction can scarcely be put on an arithmetical basis.

If it is possible to escape colds, then they are not a necessity. On the other hand, they are expensive enough to be termed a luxury.

WHAT IS A COLD?

A cold begins with a localized raw dryness at some point in the nose. There is some aching and a little fever. A few hours later a clear liquid begins to flow from the nose and the aching and general ill feeling persists. The uncomfortable area spreads until all of the upper breathing passages feel "raw." Frequently it spreads to the nerves, causing neuralgia of the


ADENOIDS
LOCATION OF ADENOIDS SHOWN X
ADENOIDS cause mouth-breathing, frequent colds, catarrh, deafness, and deformity of the jaw and chest.
They induce stupidity and stunt mental and physical growth.
NOSE
X
(MOUTH)
(THROAT)
DON'T LET YOUR CHILD BE SO HANDICAPPED.
Removal of Adenoids is a simple and brief operation.
GIVE YOUR CHILD A CHANCE TO BREATHE.

Chicago Health Department.

FIG. 14.

face and teeth. By this time the secretion from the nose begins to be thicker and whiter.

The infection is now spreading down the larynx into the bronchial tubes and the cough is becoming prominent. The nose secretion changes from a clear water to whitish mucus, and finally to gray pus and mucus. And now the symptoms begin to subside. In a few days the soreness of the throat and nose passes away, but the nose secretion and the cough hold on for a few weeks.

I have given these details because it is this type of cold that I have had in mind when advising people with colds to go to bed and send for a physician. The bacteria are spreading along the surface from the nose to the bronchi, and what is of much more consequence, they are spreading from the surface to the underlying blood vessels, and, through them, are being scattered widely—proof that they are capable of infecting the host and those with whom he comes in contact.

From the standpoint of the sick man this is the kind of a cold which demands care, since it results in pneumonia, heart and kidney disease, and rheumatism.

I am also interested in that kind of a cold which is called "the cough which hangs on," since it is so frequently an early stage of consumption.

The mild, temporary sore throats, the slight cold in the head, the little bronchial coughs, the minor colds without aches and without fever are of more consequence from the standpoint of the community than from that of the individual.

Most germs that cause diseases, called pathogenic, cannot live outside the bodies of animals. Some of these would have perished had it not been that they were kept alive as mild, apparently harmless nose infections. In winter flies find warm places in which they keep barely alive, but from these places they go out to do a great deal of harm when the season is more favorable. For bacteria some noses serve the same purpose as warm places do for flies.

CAUSE OF COLD

Colds may be due to any one of several different bacteria. They are contagious, and should be treated accordingly. While not dangerous in themselves, they become dangerous, because they spread or develop into other and more serious diseases—pneumonia, diphtheria, consumption, and Bright's disease.

Colds due to the presence of the pneumococcus, the germ of pneumonia, and those due to the presence of the germ that causes diphtheria are of the most importance. The reason for this is that these germs may produce a sore throat or inflammation of the mucous membrane of the nose, from which other people may catch diphtheria or pneumonia. While colds due to the other bacteria may not prove serious, they should never be treated lightly.

A man may catch a cold from himself. He may catch a cold from another man. When one has a cold he should avoid crowds; remain as far away from his fellow men as possible; avoid sneezing when in the presence of others, or sneeze or cough into a handkerchief held before the nose.

Besides the germ which is the exciting cause of the cold there are con-

tributing causes, such as sudden exposure to cold, exposure to hot, stuffy air, overfeeding, underfeeding, failure of the organs of elimination (bowels and kidneys) to carry away all waste products, errors in clothing, and overindulgence in alcoholic stimulants.

Colds usually begin in the nose. This is especially true where there is a crooked septum, spur or bony growths, enlarged turbinates, or adenoids to interfere with the free passage of air. A blockaded nose does not drain well, and drainage is essential.

In case of mouth breathers, or where there are diseased tonsils, the cold may begin in the throat. Such persons should exercise special care to keep the mouth clear by the free use of antiseptic washes morning and evening. The teeth should also be kept clean by brushing thoroughly after each meal.

To avoid catching colds, deformities in the nose should be put and kept in order. The tonsils, if diseased, should be removed or cared for according to the advice of a physician who knows how they should be treated.

Since lowered vitality has much to do with catching colds, body resistance should be kept up to efficiency by proper regard for body hygiene.

"Cold catchers" should not overeat or undereat; they should avoid hot, stuffy, poorly ventilated halls and poorly ventilated rooms where people assemble. They should live and sleep in the open air as much as possible, keep the organs of elimination normal, and cultivate a cheerful disposition.

THE COST OF COLDS

Last year (1915) a report issued from Boston said that an economic study of colds had been made there and that the estimated loss from this disorder should be capitalized at something over $20 a year per person. Sadler, in "The Cause and Cure of Colds," starting on the assumption that men lose on an average two days a year from "bad colds," "colds in the head," and "slight touches of the grip," calculates an annual direct money loss to wage earners of this country of $60,000,000. To this he adds $20,000,000 for money spent on patent medicines, "cold cures," and physicians' fees. He adds:

"The estimate of loss in wages does not include the loss to the employer from the days of decreasing efficiency preceding the actual absence from work of the wage earner, nor does it take into account the days or even weeks of decreased efficiency which frequently follow cold infections."

Irving Fisher in *Bulletin No. 30* quotes Dr. Charles H. Castle as estimating the average annual loss from minor ailments at three days per capita. The estimate of Dr. J. F. Morse is five days. Minor ailments include colds, headaches, toothaches, and some others.

It cannot be doubted that the direct cost of colds runs into the millions in the United States. But at that, the direst cost is a small item as compared with the indirect.

"Colds" is the term used to group many different kinds of infection. Among them are such important bacteria as those of consumption, pneumonia, diphtheria, meningitis, and the pus producers.

Among those who are said to have colds are many who are keeping, harboring, and "passing on" more violent diseases. Of importance are the nose and throat infections, which, of themselves, are of no consequence, but from

which infection travels to joints, to be called acute rheumatism; to the heart, to be called, a year or so later, heart disease; to the kidneys, to be called Bright's disease. The portal of entry is somewhat harmed, but the main trouble shows itself elsewhere. It is as if a garbage wagon, driving into a private park, had scraped a gate post but then had gone on and dumped its load on a flower bed. Fisher says:

"If what seem to be 'mere colds' were less commonly neglected, tuberculosis would more often be caught in its incipiency and pneumonia and diphtheria would often be prevented."

DRAFTS AND COLDS

There are many who need to be set right on the relationship between colds and drafts. When a man sneezes he exclaims, "I am catching cold," and proceeds to find a draft on which to lay the blame. As a matter of fact many colds do first show themselves by sneezing, but sneezing is more frequently the result of other causes. *Violent and continued sneezing is liable to come when one sits quietly in a warm room after having overeaten, or from breathing dust, or from other causes.*

In the second place colds are infections with bacteria, in which the germ is the most important element, and the condition of the man comes second but closely following. Lowering of the man's temperature, the too rapid extraction of heat, are items which influence him to catch cold in only a minor way.

And thirdly, what is ordinarily called a draft is not a draft at all. What one means when he says he feels a draft on his feet is that his feet are being chilled. Heat is being abstracted faster than it is being furnished.

As the skin temperature is over 90 and the air temperature is 70 or lower, much heat is given off by the body. The air next the skin is the warmest in the room and when currents move this aërial envelope away and replace it with cooler air, the skin may be cooled. Currents of cold air are more cooling than still air, but low temperature air may chill whether still or moving. What we call the "feel of drafts" is the feel of low temperature.

Unquestionably, to be chilled beyond the reacting power helps to bring on infections. As the *Bulletin of the Pennsylvania Tuberculosis Society* says: "To sleep cold brings on pains and assorted ills." But warm, flowing air is a draft just as much as cold, blowing air, and Leonard Hill, Fluegge, and all of the best authorities are of the opinion that health and comfort are impossible except where the air is kept in motion—drafts, if you please.

If we must have drafts, and drafts at times do harm, what must we do? Why, regulate the drafts. Get good drafts rather than bad ones.

The skin has a temperature of 96. The temperature of the room should be 68. Incoming air should not strike the body, and especially the extremities below the knees, at a temperature below 64. Incoming air should not strike the occupants at a velocity of more than 100 feet a minute, if the air is lower than 64. When the temperature of the room is 68 the leg zones should not be below 66. Young vigorous persons do not need such narrow limitations of temperature environment, but the average coddled desk worker does require them.

The fear of drafts is morbid and should end. The breezes of summer are drafts. When temperatures are regulated drafts are necessary for comfort and health. When unregulated as to temperatures they are something of a factor in colds, but not much.

SUGGESTION FOR PREVENTION OF COLDS

"I sat in a draft and caught a cold," is an expression familiar as a household remark. It is partly correct, mostly incorrect. What did happen, perhaps, is this: You remained for too long a time in a stuffy, overheated, ill-ventilated room, overate, and otherwise disregarded bodily hygiene; then put yourself in a current of moving air. You caught cold, not because you were exposed to the breeze, but because of your indiscretions. They lowered your body vitality and body resistance.

In other words, the sudden stress and strain to which you had exposed your body—the necessity for adjusting it to complex conditions—was greater than its machinery was equal to. This made it possible for the cold germs to enter the blood stream and cause such symptoms as the particular germ is expected to produce.

To keep from catching colds it is necessary to keep the body up to efficiency, and not subject it to too great a strain by overindulgence and lack of care. This can only be done by good habits of sleeping, eating, good body hygiene, and by taking plenty of exercise. These precautions are absolutely essential to health and freedom from colds.

Another thing to take into consideration is the organs of elimination. That they carry away all the waste products is highly important, as, otherwise, the blood stream becomes vitiated, thereby lowering vital resistance. The most important of these organs is the bowels. By all means do not allow yourself to become constipated.

If there is poor drainage in the air passages of the nose the cause is to be found and removed. Many times there are bony growths attached to the septum. There may be deflections of the septum. There may be enlarged turbinals.

These abnormalities reduce the size of the air passageway and interfere with breathing as well as drainage. If for no other reason they should be removed.

Where there are adenoids and polypi these should be removed, since they too interfere with free drainage and breathing.

Lack of drainage in the above named structures favors congestion, thus making an ideal place for harboring and developing the germs of various diseases. It is the presence of these germs which frequently brings us down with some serious sickness, when, for some reason or other, body resistance and vitality have been suddenly and sufficiently lowered to enable the cold germs to produce only symptoms of a cold.

Where the throat is unhealthy as a result of enlarged and diseased tonsils they should be removed. The germs of diphtheria and pneumonia have an especial liking for the fauces. They find a hiding place in and about the crypts of the tonsils.

Here they lie in waiting for the presence of such physical condition as

will enable them to cause the manifestation of such a train of symptoms as they are expected to produce.

The necessity of early recognition of such a condition of the throat and a correction thereof becomes at once apparent.

To Get Rid of Cold.—*S. J. writes: "I am 64 years old and in excellent health. For the last two years I have not taken medicine of any kind. But once or twice a year I catch cold. It always takes me about a week to get rid of it, so I suppose I am not treating my cold right. I sleep with windows open all the year. Should I close the windows till I get well when I have a cold? What else can I do to get rid of a cold quickly? As a rule my cold seems to be in my head mostly."*

Reply.—Do not close the window, but place a screen so that the air does not blow directly on you. Take one or two doses of aspirin and a purgative and let that suffice. To get rid of a cold in a week is doing well.

Toilet of the Nose.—*W. B. A. writes: "What in general is the cause of ozena? Is it usually cured by a series of treatments?"*

Reply.—Ozena is an after effect of neglected colds and chronic nose conditions. The dry nose secretions are infected and decomposing. Experimenters are working hard on a cure now but they have not, as yet, much to offer. About the best that can be done is to maintain a proper toilet of the nose.

Cold in the Head.—*H. H. writes: "As soon as cold weather comes I am troubled with cold in the head, which is almost continuous during fall and winter. The inside of my nose is sore. My health otherwise is good. What is advisable for me to do?"*

Reply.—I judge you have a chronic infection somewhere about your nose. Keep in the open air, keep away from crowds, keep out of cold places. These procedures will help you, but you should go to a nose specialist and have him find the infected area and put it in better order.

"Chronic Cold in the Head."—*W. H. M. writes: "I am troubled constantly with what is called 'a cold in the head,' accompanied by constant, heavy discharge, smarting of the nasal cavity and forepart of forehead. If not attended to promptly and relieved in some way, it travels from there to the upper part of lungs and starts a cough. I am employed nights, in an office with about 100 others, and the windows are lowered from the top for ventilation. I seem to feel the effects of the draft therefrom the moment I sit down. I wear plenty of clothes, a sweater, a hat, and when draft is overly strong, a coat, but seem to keep taking fresh colds every night or two. This often incapacitates me for duty. Can you give me any information or suggestions to overcome this trouble?"*

Reply.—The probability is that you have a chronic infection of one of the sinuses leading from your nose. Every so often it travels to your nose and thence to your bronchial tubes. To "harden one's self" by cold baths, sleeping in a cold room, eating lightly, and keeping the bowels open makes one more resistant to these excursions of the cold germs from their lair. Ofttimes it is necessary in addition to have a throat and nose specialist find the lair and clean it out.

Cause and Cure of Colds.—*M. O. writes: "1. Are aching bones and muscles, great weakness, and a dull headache symptoms of the grip?*

"2. What causes grip?

"A young man, otherwise in good health, gets such an 'attack' three or four times a year.

"3. How can he avoid it?

"4. What course of home treatment will cure him of an 'attack'?"

REPLY.—1. They are symptoms of a cold, frequently called grip.

2. Colds are caused by germs.

3. Eating lightly, hardening himself, keeping his nose clean, avoiding people with colds, keeping out of warm rooms and badly ventilated rooms.

4. Purgatives. Going to bed.

To Avoid Taking Cold.—*O. F. P. writes: "For years I have found myself a slave to a continual cold. As soon as the weather begins to get cool my cold sets in and will hold me in some way or other throughout the entire winter. I wish you would advise me as to what I should do to protect myself during the winter, as I am engaged in outdoor work the year around."*

REPLY.—1. Don't get overheated while indoors. The house temperature should be between 68 and 70 degrees (Fahrenheit), and the windows kept open to allow the constant changing of air.

2. Sponge your chest with cold water every morning.

3. Wear woolen socks.

4. Throw away chest protectors.

Treatment for Cold.—*A. M. D. writes: "Will you please outline what treatment could be given at home for the dangerous sort of colds such as you described in the paper? There are many who would take the time and trouble to do the right thing if they knew what it was, but who cannot afford a physician's attendance every time a cold is contracted. Can you tell me what causes the painful sensation in my nose when I exhale a deep breath or sneeze in cold weather? What sort of treatment could be given at home for catarrh of the nose?"*

REPLY.—Go to bed, take a purge, drink an abundance of water. You must have a chronically infected area in your nose. Catarrh may be any one of several conditions. I think yours must be due to the inflamed sore spot. You should have your nose examined and treated.

Cold Contagious.—*C. L. R. writes: "When do you consider a cold contagious? For three days I have had a bad sore throat, and now my cold is in my head. Is it now contagious?"*

REPLY.—Yes; you are right at the time of maximum danger.

Habits May Be Are Cause.—*W. L. M. writes: "1. Please explain why cathartics do not relieve a chronic cold which lasts throughout every winter? 2. Does the fact that I travel through Illinois and Iowa constantly make this cold chronic? 3. Are Rochelle salts safe for a purge? 4. Will a good purge, used frequently, stop the lodging of the refuse from the bowels at the rectum?"*

REPLY.—1. The use of cathartics will not benefit a chronic cold.

2. No. Blame yourself and let Illinois and Iowa alone. See if some

physician cannot tell you what is wrong with you or which of your habits needs to be changed.

3. Yes.

4. It is good judgment to take a purge to remedy some temporary symptom, for example a fresh cold, a headache, an attack of vertigo. To take purges regularly or frequently is the summit of folly.

Complains of Colds.—*Sufferer from Cold writes: "My wife insists that to get fresh air the windows and doors should be open. We seem hardly over one cold or cough before we get another, and I am sure it is caused by the drafts in our sleeping rooms, the windows and doors being open all the time. Every time I speak of this I am informed that you advise fresh air. If you will let us have a line or two on this subject, I am sure that many will thank you; I know I shall."*

Reply.—Your sleeping room should have the window wide open. The temperature should be 40 to 50. A screen should keep strong wind from blowing across your bed. You should have enough cover to keep warm.

If you "sleep cold" you will have neuralgia, cold, or something else. If you "sleep warm" in a cold room, you must look elsewhere for the cause of your colds.

Is your office too hot or dry? Do you ride in crowded cars? Do you avoid breathing the breath and mists from other people? Are your throat, nose, tonsils, and teeth in good clean condition?

How to Prevent Colds.—*Mrs. A. B. C. writes. "1. I have a cold in my head and I'm aching and sore below the breasts and around the ribs. My back is sore and aches. I have a slight cough. Does this mean my lungs are affected or is it pleurisy?*

"2. How can one who is subject to colds prevent them? Does chronic constipation have anything to do with it? This soreness in the ribs I have most of the time, even when I have no cold. My doctor says it's sore nerves."

Refly.—1. Your physician probably is right, since you have the pain in your chest most of the time. A cold accompanied by general aching pain around the ribs, and a little cough, all coming on as an acute attack, usually means pleurisy.

2. By keeping the tonsils and teeth clean and the bowels open; by eating moderately; by sleeping in a well-ventilated room and keeping out of hot, ill-ventilated, and especially crowded places; by taking cold air or cold water baths.

Take Care of a Cold.—*J. G. A. writes: "I notice in your article of 'How to Live to a Happy Old Age' you speak of avoiding pneumonia by taking care of a mild cold, etc. Please tell us how to take care of a mild cold. 'Take care of a cold' or 'do not neglect a cold' means but one thing to the masses who read it, and that is to dose one's self with some of the various brands of cough syrup, a meaning which you and other physicians do not intend to convey."*

Reply.—To take care of a cold means: (1) to take a purge; (2) to eat lightly; (3) to go to bed and stay there until the fever and aching has ended.

CATARRH

Colds are due to bacteria. These germs locate somewhere on the lining of the nose. They travel along the surface and find their way into the cavities that open off the nose. We might compare this process to an overflowing stream.

When the acute infection subsides in the nose proper, a suppurating area is left behind, usually in some one of these cavities. When the overflow subsides everything drains off and dries out except certain low places that stay like malaria-breeding, snake-infested ponds.

These sinuses, or cavities, discharging pus that drains into the nose periodically is what is called catarrh. From such pools are absorbed the poisons which cause the suffering of so-called catarrh. From them are absorbed some of the germs which cause rheumatism and rheumatoid arthritis. They are responsible for various forms of neuralgia, some of which are not easily diagnosed.

Inflammation of the nose caused by colds and grip may extend upward through the eustachian tube to the middle ear. When this occurs the lining of the tube often closes the passage through it so that fluids forming in the middle ear cannot escape into the throat. These conditions are sometimes present in such quantities that they break through the drumhead, and the fluids are discharged externally.

Such conditions may cause severe pain (earache), which nearly always subsides with rupture of the drumhead and discharge of fluids and pus. When the matter reaches this stage it should be regarded as serious.

If people would hear well when they are old, they should take good care of their ears in their younger days. To do this the nose and throat should be kept healthy, and earache or running ear properly treated early.

Nose diseases are responsible not only for ear and other diseases; they are responsible for many eye disturbances. Hence, before having glasses fitted to your eyes, it is well to discover if there is some nose disease present. If so, this should be corrected, and then the eyes cared for. In many cases after the nose disease is cleared up eyeglasses are no longer needed.

Chronic Catarrh.—*Reader writes: "I am troubled with chronic catarrh. Is there a cure, climatic or medical?"*

REPLY.—Chronic catarrh means nothing. There are about as many different conditions called chronic catarrh as there are kinds of men called Smith in a city directory. Find out from a throat and nose physician what your trouble is, and have done for it whatever is advised. "Shotgun" douching slops are useless.

Catarrh.—*H. M. I. writes: "If one has catarrh is it beneficial to spray the nose and throat? If so, will you please tell me what preparation to use, and how often?"*

REPLY.—It will help to keep the nose clean and, in this way, will be of some service. Use Seiler's or Dobell's Solution. Your druggist will furnish either. The proper policy for you is to go to a nose specialist, find

out what is the matter with you, and have the condition corrected. Catarrh is only a symptom. There is no such disease.

Catarrh a Symptom.—*L. E. writes: "You recently declared "catarrh is a symptom." As I am troubled with what is commonly called nasal catarrh, I would be interested in knowing what it is a symptom of."*

Reply.—Catarrh is a symptom of any one of several conditions, such as enlarged turbinated bones, spurs on the septum, polyps, chronic infection of the nose, chronic infection of some cavity leading from the nose. Still others might be mentioned. Is it wise, when a disease is known by a catch-all name, to try to treat it as if it were one and the same condition in everybody who has it?

Vaccine for Nasal Catarrh.—*H. H. writes: "Will you please tell me if there is a cure for nasal catarrh? Is there a cure for a man who has been wearing glasses for the last six years, such that he will not have to wear them? Will nasal catarrh give a person weak eyes?"*

Reply.—1. Suppose you try a vaccine. Your physician will direct you.

2. I don't think so. Nearsightedness starting in childhood is sometimes so corrected by the changes due to age as to make it possible to leave off glasses. I don't think you belong in that group.

3. No.

See a Physician.—*C. D. F. writes: "What causes catarrh, and is there no cure for it? Do you think the advertised patent medicines for catarrh safe?"*

Reply.—The advertised remedies are useless at best. Many are harmful. Have a physician find out just what is the disease in a case of so-called catarrh. Most nasal diseases are curable. Some are the effects of neglected conditions. These generally cannot be remedied.

Catarrh of the Head.—*Reader writes: "What do you consider the best cure for a catarrh of the head, especially ringing or buzzing of the ears? Are Glauber's salts helpful for constipation?"*

Reply.—Catarrh of the head is a term used loosely to cover several different conditions. Find out which you have and have that one treated by a competent physician. As to Glauber's salts, no.

Treatment for Catarrh.—*F. E. Z. writes: "Will you kindly inform me whether or not there is a cure for catarrh (chronic)? A physician advised me that the only cure was a change of climate, and that not always a cure."*

Reply.—Find out what is the condition in your nose. Many different conditions are called catarrh. Some are cured by operation, some by change of climate, and some in other ways. Many cases are of no consequence. Catarrh does not lead to consumption or any of the so-called catarrhal states played up in the advertisements.

Offensive Breath and Catarrh.—*M. E. C. writes: "Is there a cure for catarrh of the head, causing bad breath? I have taken patent medicine, but the catarrh returns."*

Reply.—The form of catarrh causing bad breath is known as atrophic rhinitis. In this form the mucous membrane has shriveled and its glands

secrete but little moisture. Hard, dry scabs form and these decay, causing the odor. The National Association of Nose Specialists has a committee to find out what it can about this condition, what causes it, and what cures it. Some physicians recommend injecting paraffin under the membrane of the septum. Frequent and thorough washing keeps down the odors. Patent medicines and catarrh remedies will do you no good.

SORE THROAT

Grown persons as well as children suffer from sore throat. Dust, dampness, diphtheria, and other germs are the chief causes. Sudden chilling of bare feet, coddling, mouth breathing, overcrowded and overheated dwellings sometimes serve as the beginnings.

The distinct germ infections, particularly diphtheritic sore throat, are the most serious. Children are attacked more frequently. Their close association at home, at school, and at play helps the disease to spread amongst them.

Sore throat in young or old should not be neglected. The first principle of treatment is not to get it. Avoid overcrowded and overheated places, mouth breathing, and coddling. Avoid contact with people who have sore throat.

Simple sore throat in healthy adults is not often serious unless it recurs frequently. Sore throat in children is always a serious proposition for the following reasons:

1. They "catch" it easier.
2. They cannot be depended upon to guard against it.
3. It is more often diphtheritic.
4. Some are too young and others don't know enough to complain of it.
5. They are very apt to develop the form of sore throat known as "croup."
6. Their resistance to disease is not so great.
7. If they get diphtheria it often leads to very serious after results, hindering growth or permanently maiming.

Sore throat in a child should be given immediate attention. Complaint of the child or the following symptoms should put you on guard:

1. Feverishness.
2. Paleness.
3. Difficulty in swallowing.
4. Croupy cough.
5. Hard breathing.
6. Running of the nose.
7. Swelling of the neck below the ears.

If you notice any of these symptoms, call your doctor *at once.* Many mothers do not call a physician until they see white patches in the throat. Don't wait for that. That is giving the disease a good start and the child a possible bad finish. The membrane may be in the windpipe and not visible.

Castor oil, cloths about the neck, ham slices and turpentine, which mothers frequently use, do not cure sore throats. In diphtheria they are positively injurious on account of the loss of time occasioned by them in getting the proper treatment.

If your child has a sore throat do not trifle with it, do not neglect it, do not attempt to "cure it up" or to cover it up. The best and only thing to do for the child with sore throat is to call in a physician.

Hoarseness.—*Mrs. G. R. H. writes: "I am a woman of 50. When younger I had a good voice, but now I grow hoarse after singing a few lines. Talking is difficult sometimes. 1. What causes it? 2. Can anything be done? 3. What causes a neuralgic condition of the bowels? The pain is mostly of a heavy, dull nature instead of sharp and cutting. 4. Can anything be done to prevent it? I have been troubled with it at times for five years. 5. Is there any remedy?"*

REPLY.—1. You probably have nodes, cord nodes, or a chronic laryngitis.

2. See a throat specialist, particularly one who has had experience in treating singers and speakers. Perhaps the condition can be remedied. Probably, however, it cannot be. In those cases where help is possible it means a good deal of trouble and expense.

3. Pain in the abdomen may be due to different things, such as gallstones, intestinal ulcers, appendicitis. Have a physician find out what is the cause of your pain. The answer to your other questions is dependent on the answer to the third.

Wash the Throat Daily.—*A. L. F. asks: "1. Would the daily use of a throat wash be advisable? 2. If oxygen in air is good for us why not breathe oxygen out of a tank?"*

REPLY.—1. Yes. It is wise to wash the teeth, gums, tongue, and throat every day.

2. Good pure air is 1 part oxygen, 4 parts nitrogen, a trace of carbonic acid, and a little moisture. Pure oxygen is not so good for a well man as pure air. There is such a condition as "too much of a good thing." Pure air contains about the best proportion of gases for human use. The harm that is done by bad air is due to the impurities in it rather than to a lack of oxygen.

Trouble in Throat.—*C. C. C. writes: "I have been troubled of late with a swollen throat; at times it is so bad I can hardly swallow. I am continually troubled with a cold, and have a large lump in my throat, and expectorate small lumps of a yellow, heavy substance. What are adenoids? Do you think my tonsils are affected? I have had medical examination several times, but have been advised that I had nothing but a cold, and was prescribed for accordingly. Do you think the bad atmosphere and poor ventilation of the office in which I work can have anything to do with the case? I am otherwise in perfect health, and am a hearty eater."*

REPLY.—Adenoids are enlarged lymph glands in the back part of the throat, behind the soft palate. As you tell me nothing about your tonsils, I cannot judge whether they are affected. It seems to me quite certain that you have some mild infection somewhere in your upper breathing apparatus, and a poorly ventilated office is the most likely cause.

Sore Throat.—*M. C. G. writes: "I suffer with sore throat constantly, summer and winter. The crypts in my tonsils fill with white matter and I am told my throat is sore on account of being always infected. Is it a*

coincidence that I have a sore throat every time I get damp or chilled? Or has this something to do with the process of infection?"

REPLY.—Chilling or getting damp causes some of the bacteria in the crypts to infect you. You can be infected by bacteria in the crypts of your tonsils as readily as by those in the throats of other people. Have a physician empty the crypts at intervals or else have him remove your tonsils.

CHAPTER VI

Cough—Asthma

COUGH

Whenever there's a cough there's a reason. A cough means that something is irritating the coughing center in the brain. The brain has a cough center just as it has a speech center. A brain center is like a telephone switchboard. It is a collecting place with incoming and outgoing wires. There may be trouble in central, whereupon the ability to cough is lost and the bronchial tubes fill up with secretion. The man may drown in his own secretions.

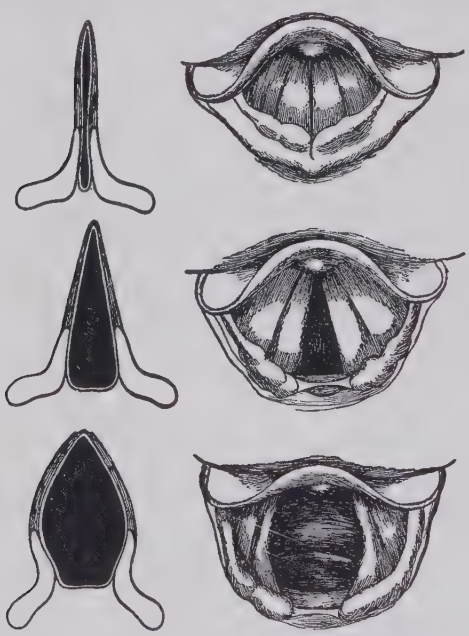


FIG. 15.—LOOKING DOWN THE WINDPIPE FROM ABOVE, SHOWING VOCAL CORDS. Glottis closed—half open—wide open.

The irritations capable of causing cough come over eight incoming lines:

1. From the brain covering—of no consequence.

2. From the ear canal. Notice the tendency to cough when you remove wax from the ears.

3. From the upper back part of the mouth and nose—a trunk line frequently used.

4. From the back part of the tongue down the windpipe to the vocal cords. This trunk line keeps the windpipe clean.

5. From the lower windpipe and lungs. This trunk line keeps the smaller air tubes clean and gives air a right of way.

6. From the heart—a little used wire.

7. From the esophagus—usually a dead wire.

8. From the stomach—generally a useless trouble maker.

Any irritation along any of these lines may result in a cough. If the irritation comes in over Trunk Line 4 or 5 it means that somewhere in an air passage something has got in the tube and an effort is being made to clear it out. When the message comes in over Line 5 it means that the lungs are trying to help themselves. The lungs have but this one way to cry. They have but few ordinary nerves—nerves to register heat, or cold, or pain. When there is pain in the chest it is in the chest wall or pleura.

If the small bronchials send in a complaint that there is pus and mucus in the way and that air is being kept out the coughing center sends down a muscle impulse. A cough results and the offending pus is moved out of the way.

A cough that brings something up is helpful. We divide coughs, therefore, into those that are helpful and those that are useless. Helpful coughs are to be encouraged; useless coughs are to be discouraged.

Right there is the keynote to the treatment of coughs. The old style plan was "to take something for a cough," to take the same thing for every cough. That something usually was an opium mixture. Often this practice worked out this way: The lungs sent up a message, "Send me a cough to clear the airways." The answer was a dose of opium, which cut the telephone wires and left the lungs floundering.

USELESS COUGHS

A cough that does not clear out something is a useless cough. Useless coughs should be suppressed. The way to suppress the cough is by remedying the cause—if it can be done.

Sometimes the cause is wax in the ear—remedy is easy.

Sometimes it is eczema in the ear canal—remedy is more difficult.

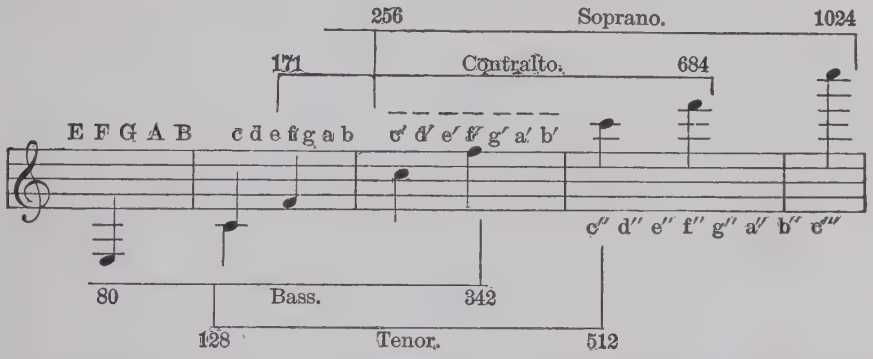



FIG. 16.—THE AVERAGE RANGE OF THE HUMAN VOICE. c′ to f′ is common to all voices. The figures indicate the number of vibrations per second in the corresponding tones. (Landois and Stirling.)

Sometimes it comes from smoking or dust—easy to suggest the remedy, but hard to get it carried out.

Sometimes it is the result of other irritation in the upper air tubes. Illustrations of this group are elongated uvula, enlarged tonsils, large turbinate bones, polyps in the nose. The remedy is removal of the irritating tissue.

Sometimes the irritation is due to causes operating indirectly on the nose and throat; for example, coughing spells when the skin is chilled or is overheated. Of this group are the coughing spells that develop in the theater, those that come on in other warm, closed rooms, also those that develop as the temperature of the bedroom changes during the night. The remedy for this group is better temperature regulation.

Sometimes a coughing spell starts when one lies down. Think of an elongated uvula as a probable cause.

If the coughing spell comes on as the result of exertion the cause may be heart disease or pressure on an air passage, from an aneurism or a tubercular gland attached to an artery wall in the chest.

Finally there are the stomach coughs. Even when the cough is for the purpose of clearing mucus and pus (called sputum) out of the air tubes a good many of the coughing spells will bring nothing up. Those particular coughing spells have been useless. The irritated apparatus is temporarily set on hair trigger and it "goes off half cocked" about as often as otherwise.

The offending mucus is gradually being worked from the air cells toward the larger tubes by tiny hairs called ciliae. After it has worked far enough up the lines the cough can catch up and carry it away.

The movement by ciliae is slow, by cough fast. When one's coughing apparatus is on edge it keeps grabbing at the mucus before it gets in reach or before it can get a hold on it.

Such coughing spells are useless. They are worse than that. They hurt the air tubes and air sacs; they tire the muscles; they use up energy.

Where there is consumption, pneumonia, bronchitis, or colds, anything which results in mucus and pus in the tubes, such coughing as produces phlegm should be encouraged. Such as is unproductive should be discouraged.

WHAT TO DO FOR A COUGH

The first question to be answered is, Shall anything be done for a cough? The old policy of taking medicine for a cough beyond question was harmful. It made dope fiends. In most cases nature went ahead and cured the cough in spite of the dosing with morphin-filled expectorants. The expectorants got the credit because nobody thought to try nature without expectorants, and therefore nobody was able to say which cured the quicker.

The proper answer to the question depends on the cough and the cougher. Coughs are divided into useful and useless. Useless coughs should be discouraged. How? If the cause can be removed, the way to discourage the cough is to remove the cause. If the cough is due to warm, bad air the proper procedure is to get into fresh air—not to take cough drops. If you doubt this, go to any fresh air consumption hospital and listen for coughs. Fresh, cool air is a better cough allayer than paregoric.

But not all of the freedom from coughs at a sanitarium is due to fresh air. The patients are trained not to cough uselessly. They learn to cough when they need to in order that the tubes may be cleared out. They also learn not to cough when there is no need for it.

How do they tell? Nobody can tell. But there is a little different "feel" when the something is in reach. Any one can speedily learn this "feel"—and then comes the effort to resist the impulse to cough when the "feel" is not present. Ofttimes the force of will is sufficient. When it is not there comes the question of cough medicine. There are times when the hair trigger state can be calmed down better by a dose of cough medicine than in any other way.

There is a field for cough medicines. The mistake comes in promiscuous doping for coughs. There is even a field for cough medicines containing opium. But they do more harm than good if they are used longer than a few days, or habitually, or indiscriminately. The so-called consumption cure cough

medicines are safer now than they were before the food and drugs act of 1906. The amount of opium, codein or heroin contained is printed on the label. Previous to the act some of them had more opium inside, but whether more or less none of them told on the label how much opium was contained or that any was present.

The answer to what to do for a cough should include an answer to what to do with the sputum. The answer is to burn it or cook it regardless of the cause of the cough.

Mild Climate Needed.—*J. A. W. writes: "A lady, aged 70, has been troubled for three or more years with coughing spells at night and sometimes during the day, raising a slimy mucus, which, when examined, indicated no consumption, the doctor stated. He calls it bronchitis. Will such affect the lungs? Can bronchitis be cured? If so, where? The same lady also has an inward goiter of small size. Would it produce coughing spells, as above? Can it be cured? If so, where? The coughing, when started, lasts quite a while and completely tires her out. It is more noticeable in winter than in summer. Please express your candid opinion."*

REPLY.—Chronic bronchitis in an old woman may not be due to consumption. Such a bronchitis may bring on a bronchial asthma, make the person short-winded, or some other inconveniencing condition. If you can find a cause for the bronchitis and remove it, you will get well. If it is due to a change in heart or kidney, or blood vessels, due to age, you probably will not get well. A milder climate—the South or California—will help you if you can be comfortable and happy away. Goiter occasionally causes coughing through pressure. In a person of 70 it is rarely advisable to be operated on for goiter.

Chronic Cough.—*J. H. writes: "I am continually suffering from a cough, and I am always coughing up gray pus. What is the cause of this?"*

REPLY.—It is bronchitis. It may be a tubercular bronchitis, otherwise consumption. Get your sputum, the gray pus, examined right away. The examination will show whether it is a consumption bronchitis or some other sort.

ASTHMA

The object of breathing is to get oxygen into the blood and waste gases out of it. Whenever the breathing center in the brain feels the need of more oxygen and less carbonic acid and at the same time the passage of gas between the lungs and the blood is interfered with, the condition is called asthma.

In asthma the patient feels the need of air. So far as he can see there is no reason why his blood cannot take it up, but somehow or other it does not. And that is asthma—a yearning for air which somehow cannot be satisfied. It is just a symptom, not a disease at all. Therefore Stedman's dictionary gives eighteen kinds of asthma.

Sometimes the trouble is with the kidneys, sometimes with the heart, sometimes with the thymus, nose, the sex organs, the tonsils, the nervous system, the bronchial tubes—anything that prevents a free play of gases between the lungs and the blood and leaves the breathing centers on edge to help out.

Asthma comes in paroxysms. It may disappear entirely and for a long time or it may continue without intermittence, getting better and worse. Spells generally come on at night. Bad weather may bring on an attack. So may any emotional disturbance or a bad cold.

In a bad attack the patient has to stop everything else and work at the job of breathing. He sits up because that is the easiest breathing position. He may seek an open window. His face registers distress. His abdominal breathing is exaggerated; his chest breathing, strange to say, is below normal. He coughs. The mucus rattles in his bronchial tubes.

The theory is that the reason asthma gets worse and better by spells is because the muscles surrounding the small bronchial tubes contract spasmodically and then relax. When they contract a paroxysm of asthma results. When they relax breathing becomes easy again.

These small muscles are not at the end of the bronchial tubes. The end of the tube is an air sac, and that has no muscle in its wall. But when the muscles in the tube walls spasmodically close down the shape of the air sac is changed. It cannot do its work and the blood vessels cannot get oxygen from it or feed it carbonic acid, as is normal.

All asthmatics have bronchitis a good part of the time and some of them have it all the time. Nevertheless, bronchitis is an attachment of asthma and not an essential.

Being no one disease, asthma has no one treatment. What helps one asthmatic is of no service to the next. One man finds relief by having his nose treated. Another gets well by changing to a dry climate, where his bronchitis dries up. A third finds relief from changing to a vegetarian diet, eschewing meat, milk, eggs, and all other foods rich in the amino-acid, histidin.

Because one man has been cured by a given procedure it does not follow that the next will be benefited by it. The proper plan is a careful study of the given case, and that, too, before the disease has run too long. Men get the asthma habit just as men get the fit habit in epilepsy, and after the habit has been well established the symptom may persist after the cause has been removed.

Incipient Asthma.—*A. B. L. writes: "Is asthma a form of tuberculosis? What treatment can be given in incipient asthma to avoid its becoming chronic? If a patient sleeps with much air in the room will it bring on an attack? Could asthma symptoms be mistaken for symptoms of goiter?"*

Reply.—1. Asthma is not a form of tuberculosis.

2. To prevent incipient asthma from becoming chronic, avoid all irritation that brings on an acute attack.

3. Much air in the room will not bring on an attack if the current of air is directed so as not to strike the body directly. A slanted board put into the open portion of the window, so as to direct the current of air upward, or a cloth hung across the open space will do that.

4. Asthma is not usually mistaken for goiter. The two conditions may be associated.

5. Asthma is frequently a symptom of heart or kidney disease. Is it with you?

Curability of Asthma.—*W. T. H. writes: "Kindly let me know if there is any positive cure for asthma that you know of. I know it can be helped through medicine; also that a change of climate sometimes effects a cure."*

REPLY.—Some cases of asthma are due to heart disease, some to kidney disease, some to bronchitis, some to polyps, etc. The question as to the curability must be answered for each case.

Find Underlying Cause.—*M. R. writes: "Is chronic bronchitis curable? If so, how? Life in New Mexico for more than a year has made the cough worse. Do you believe the more even temperature of southern California would be better, even if more moist?"*

REPLY.—1. The curability of chronic bronchitis is determined by what is back of it. Most cases are due to tuberculosis. Many are asthmatic; many are due to heart disease. What is to be done is to be determined by what underlies it. If tuberculosis, no climate will be so helpful as the one you are in. If asthma, try a vaccine. If heart disease, at whatever altitude your heart works best you will find the most ease.

Bronchial Asthma.—*R. N. D. W. writes: "Kindly give advice regarding bronchial asthma. If a man in the forties has had asthma only two years, it following a case of the grip, should he not get over it?"*

REPLY.—Can't you get back of that diagnosis? Many cases of bronchial asthma are in reality consumption. Some cases are due to heart disease, some to Bright's disease, some to growths in the nose. In a case of asthma the first thing to do is to find if there is a curable cause, and then to cure it. The case of asthma which cannot be cured is about as hard to do anything with as any disease I know. Climate helps more cases than anything else.

May Be Asthma.—*Mrs. E. R. writes: "My daughter is troubled with shortness of breath. Sometimes it is hard for her to breathe. What is this caused by? Is there any danger?"*

REPLY.—I can do nothing more than guess. My guess is that she has asthma. Her asthma may be due to heart disease or kidney disease, or it may be ordinary asthma, called bronchial asthma, or it may be due to other causes. Nobody is justified in allowing shortness of breath to run on. Always find out what lies behind it. It may mean a most dangerous condition or it may mean a disturbing but not a dangerous condition.

Various Causes for Asthma.—*J. R. L. asks what is the best cure for asthma and how to keep from getting asthma.*

REPLY.—There is no "cure" for asthma. There is heart asthma, which can be partly relieved by treating the heart; kidney asthma to be treated by treating the kidney; asthma due to reflexes from nose conditions, to be treated by treating the nose, and asthma associated with chronic bronchitis, the cause of which is not yet worked out. Because one case of asthma has been relieved by a given remedy does not mean that the same treatment will help the next man. The so-called asthma cures seldom do good, and, taken indiscriminately, may do harm. Some of them lead to drug habits.

CHAPTER VII

Bronchitis—Hay Fever

BRONCHITIS

The bronchi are the tubes which carry the air to and from the air sacs. The first part of the air tube is the nose, the second part is the pharynx, the third is the larynx, and the fourth the trachea.

After the tube has reached the root of the lungs it branches, sending one tube to each lung. From the point of branching on the air tubes are called the bronchi.

It will be noted that the bronchi lie deep in the chest. Immediately after the division each bronchus enters the root of a lung and immediately divides. The constantly dividing tubes get smaller and smaller until the name bronchioles is applied to them. The air sacs open off the bronchioles.

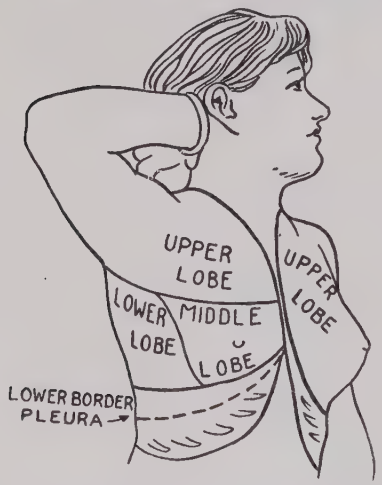


FIG. 17.—LOCATION OF THE LOBES OF THE LUNG AND OF THE DIAPHRAGMATIC PLEURA.

Bronchitis is inflammation of the bronchial tubes. Theoretically the inflammations of the larynx are called laryngitis and those of the trachea are called tracheitis. In everyday life we are apt to call any inflammation of the air passages which results in cough bronchitis.

As the air which enters the bronchial tubes has not been filtered of its bacteria, infections of the bronchi are frequent. In fact, bronchitis is a bacterial disease. Practically there is no cause of bronchitis except germs. Every case of acute bronchitis is a case of infection. The same may be said of chronic bronchitis, for even in those cases when the first cause was not an infection infection soon occurs and remains thereafter the most prominent element in the case.

The prominent symptom of bronchitis is cough. The cough is the result of irritation of the nerves of the bronchial tubes. Impulse to cough is furnished by these nerves. The force of cough is furnished by the muscles of the abdomen, the diaphragm, and the chest wall.

The "soreness in the lungs" in bronchitis is not soreness in the lungs. The lungs do not have that kind of sensation. The soreness is in the muscles

overworked by the effort of coughing. If there is sputum in the bronchial tubes and a current of air can be got behind it it will be coughed up. The muscles of the chest or of the bronchial tubes do not directly expel the sputum; the force is the blasts of air which we call coughing.

The above statement of facts is meant to be informing. Now let me add a practical point. Nine times out of ten a cough will do better without cough remedies than with. Cough remedies contain two types of medicine. One is a group called expectorants, such as carbonate of ammonia, muriate of ammonia, squills, tolu, etc. Careful experiments have shown that these medicines do not loosen the phlegm or cut it or affect the cough in any way. They do nothing but ruin the stomach. Therefore mark this, never take any cough medicine that contains any one of them or any other expectorant.

The other group comprises the sedatives. The most frequently used of these are heroin, codein, and morphin. If a cough is dry, hacking, and persistent a dose of cough medicine containing a sedative will do good.

The object of cough is to clean the tubes. If it does not do that it is doing some harm. Therefore one is justified in taking a sedative for a useless cough.

However, forget not the harm which comes from overindulgence in heroin, codein, and morphin. Unless they are used judiciously the remedy is worse than the disease.

Chronic Bronchitis.—*M. R. P. writes: "What can I do for a child who has coughed most of the time since she was 9 months old? She is now 6½ years old. She coughs at night, at times two hours steadily, then again from 5 o'clock in the morning until she gets up in the morning. She has slept on the porch since last May. Would you advise sleeping indoors while coughing so hard? Have tried camphorated oil and almost everything without success."*

Reply.—I judge the child has a chronic bronchitis. This condition does not threaten life, but it is hard to do anything with. It is likely to keep hanging on. Is it possible to keep her in the dry region of the southwest for a while—say western Texas, Arizona, or New Mexico? Wherever she is, she must lead the most hygienic out-of-door life possible. As to sleeping out, I would say make proper arrangements for her comfort and have her stay out. Keep her out much of the time during the day also. Feed her up well. These are the lines toward which to look for help rather than applications of oil and other things to the chest.

HAY FEVER

For a long time people scoffed at hay fever; said the sufferers were hysterics, neurasthenics, and faddists; that everybody had summer colds; that the poor man called his sickness a cold and stayed at home; while the rich man called his hay fever and took a long vacation. There are still people who scoff, but they are not so aggressive as they were.

Medical science has gone far enough to clear the hay fever sufferers of the charge of bad faith, without, however, having gone far enough to cure or prevent the disease with any degree of certainty. The science has worked out the basic, pathologic principle of the disease, has found a way to help some

cases, but for the great majority it cannot do much more than tell them when to run and where to run to.

Fig. 18.—Wormwood (*artemesia absinthium*). (Dr. William Scheppegrell.)

For a long time it has been known that certain persons were capable of being violently poisoned by substances which were not in the least poisonous to the general run of people. For instance, while hay fever appears at any time of the year, two usual varieties are recognized—the spring and the fall. The kind that comes in the spring is attributed to the pollen of different kinds of grasses, hays, and sedges.

In addition a man having an idiosyncrasy toward horses would sneeze violently whenever he came near one. Another would eat a salad containing some lobster, and within a few hours would be badly broken out.

A certain physician took anti-plague serum when he was working at the suppression of plague in California. For ten years thereafter, and perhaps even yet, he broke out in great wheals whenever he got into cold water.

A term used to designate this peculiarity was *idiosyncrasy*. Some of these idiosyncrasies were scientifically studied with the result that a good deal was learned about a subgroup that was called anaphylaxis, or the condition opposite to prophylaxis.

The idea of the scientist naming the condition was that, *prophylaxis* having to do with protection against a poison, *anaphylaxis* would be a proper term to use when, on the other hand, the body became exquisitely sensitive to a poison.

The proof that hay fever is an anaphylaxis is not convincing. Nevertheless it seems plausible that, in hay fever, the susceptibles are poisoned by vegetable irritants—pollens that are bland enough not to affect the general run of people.

A person suffering from hay fever has the usual symptoms of a bad cold, plus some spasmodic symptoms. His illness has a greater tendency to hang on. An ordinary cold passes in two or three days through the dry stage, then the watery-eye, watery-nose stage, and later, into the stage of mucopurulent discharge.

The hay fever subject weeps for weeks. An ordinary cold is prone to develop into pneumonia or rheumatism or something else serious. Hay fever seems to satisfy its ghoulish glee in just being hay fever. The disease differs in so many particulars from an ordinary cold that almost anybody can make the diagnosis.

Elsewhere we have drawn the distinction between diseases whose harm is measured by the numbers killed and others by nonfatal illness caused. A good illustration of the latter group is malaria, with us a disease not important as a killer of men, but important as a destroyer of human efficiency.

It is by the same yardstick that hay fever is to be measured. It does not kill, but for many men it shortens the working year from twelve months to ten.

In addition, indulgence in hay fever draws on the storehouse of vitality. Every experience that wears and tears draws from the bank some of the capital stock with which life began, or from life's savings account, or both.

Whenever a physician comes in contact with a hay fever patient he must start his consideration of the case by thinking of the patient himself; then he considers the patient's nose, and, last of all, he takes dust, pollen, and plant life into consideration.

Generally speaking, hay fever subjects are neurotics and neurasthenics. This means that they are generally susceptible to irritants, they may be upset by various things which glide from the calmer man like water from a duck's back.

When it comes to treating hay fever the physician must pay a little more attention to the way the patient looks at things—the psychology of the situation—than with the usual run of men.

Passing briefly to the second head, nasal spurs, enlarged turbinated bones,

FIG. 19.—RAGWEED (*Ambrosiatrifida*). (Dr. William Scheppegrell.)

deviated septums, infected accessory sinuses, abnormal conditions are of importance in many cases.

Therefore, a physician consulted by a hay fever subject should study, first, the temperamental makeup of the patient, and, next, the condition of the nose and the cavities leading from it. Sometimes he should prescribe rest cure, psychotherapy, tonics, iron, arsenic; and proper cases will be bene-

fited thereby. Operations in the nose, from burning with a cautery anywhere, sometimes in the cavity (and one place to burn is as good as another) to the removal of polypus, will help greatly.

Now let us briefly touch on washes, snuffs, and cures. Not any wash is better than no wash, and some are much worse. The nasal secretion is wash enough. But if the patient must have something, let him use some placebo, something with no effect at all except that from suggestion.

Above everything, let him refuse to use cocain, morphin, and adrenalin, and every snuff, or wash, or cure that he does not know to be free from them.

In the United States Hay Fever Association's leaflet for 1912 three pages are given over to "Sneezes and Snuffles, Joy and Gloom in 1911, Experiences of Members." Thirty-seven experiences are told. Some narrators were cured by this thing, some by that, and some by nothing.

Hay fever illustrates well the folly of drawing conclusions from a single experience, especially a personal experience, the most misleading of all experiences. When there is a multitude of cures, there is no cure. As Osler's "Modern Medicine" says:

"Every patient who has tried the whole series of remedies is always convinced that there is no cure for hay fever."

Having considered the temperamental basis of the disease, and then the relation of the nose, we come to the aggravating cause. This disease differs from an ordinary cold in that the exciting cause, instead of being a microscopic vegetable called a bacillus, or a germ, is a microscopic part of a vegetable, the part called the pollen. A cold may be caused by any one of several bacteria. Hay fever may be caused by any one of several pollens.

In the present status of hay fever therapy interest centers in those things that relate to pollens. While hay fever may develop at any time of the year, most of the cases fall into the spring or the autumn group.

In this country there is little spring hay fever. The disease of the springtime is caused by all kinds of grass and hay pollens, by the pollens of different sorts of sedge, by that of lilies of the valley, of cabbage, thistles, and spinach.

That of the fall comes from ragweed, golden rod, daisies, and a few other plants. It is pretty well accepted that eighty per cent of the August cases are due to ragweed, and practically all of the balance to golden rod.

Accepting these statements as true, there are two things to do in the way of prophylaxis. The one is a community matter—to cut the weeds before pollen time. The other is an individual matter—to run away from the pollen which harms the individual case.

In "Sneezelets," the bulletin of the Hay Fever Association, is the following:

"Anti-weed ordinances are on the books of most municipalities, but that is about all that can be said of them. Let every hay feverite write to the city board of health, calling attention to specific places where the sharp edge of a scythe will prevent the spread of pollen before the blooming period arrives. Enforcement of the ordinances will relieve the distress of many sufferers."

In this connection we must remember that ragweed is a plant which depends on the wind for fertilization of its seed by pollen. Such plants must "paint with a comet's tail." There must be a wild extravagance of pollen, and no anti-weed campaign will accomplish anything unless it is fairly citywide.

When is the time to run? Research indicates that the pollen poisoning begins with the first dose inhaled, increases a little day by day, until, after a few days, the flood gates break loose.

Each hay feverite knows just about the date when his attack is due. He gains nothing by running from any pollen except that which poisons him. The season may be a little backward or a little early, and so he may modify his departure by the state of vegetation.

Having determined to go away, the question is—where? The answer is to go to a place where the harming weed does not exist or has already flowered.

Many escape by remaining at sea until the season has passed. Some escape by going to sections where the ground is barren. Many go to Europe, where the flora is different. Some go south, where the disease is not prevalent, and others go north.

The proper plan, in a general way, is to travel north or south, and to travel far, rather than to go east or west. Some writers claim that the disease does not exist at all in the South; it is certain that it is not abundant there. In addition, the stage of vegetation there in the middle of August differs much from that of the North.

For these reasons it seems to me that a visit to the gulf coast or some of the islands near by should be as good a preventive measure as one could find.

FIGHTING HAY FEVER

Many attempts have been made to vaccinate against hay fever. The German remedy, pollantin, is a preventive rather than a cure. So are the remedies made from bacteria.

Last year we published the suggestion of Dr. Scheppegrell of New Orleans that hay fever subjects accustom their noses gradually and in advance, according to a method he proposed.

The last number of the *Journal of the American Medical Association* contains a letter from Dr. Brown of Minneapolis, suggesting another way to vaccinate against hay fever. Dr. Brown's son is a hay fever subject.

Dr. Brown collected some ragweed pollen. He ground up one dram of this in one ounce of glycerin. This was filtered and brought up to two ounces with water. To the mixture were added five drops of strong carbolic acid. He washed his son's arm with ether, placed a drop of the pollen solution on the skin, and made a vaccination scratch through it. This scratch healed promptly. Three days later the process was repeated. In a short while the skin around the wound looked like the hives.

Dr. Brown suggests that people start with this solution diluted one to one million; that the vaccinations be done once or twice a week, and that the strength of the solution be increased as rapidly as possible without producing hive-like swelling. All of this is to be done before the attack is due.

At the New York cancer hospital, Dr. Clowes has been working on the nature of hay fever. He found that hay fever subjects were exceedingly sensitive to pollen. Those who had fall attacks were sensitive to autumn blooming plants; those who had spring attacks were affected by the pollen

of spring blooming plants; while those who were subject to both spring and fall attacks were sensitive to both spring and fall pollens.

Dr. Clowes vaccinated through the skin and also injected hypodermically. He got both local and constitutional symptoms somewhat as they are in hay fever.

It seems positively proved that hay fever is not an imaginary disease and the sufferers have not always been justly treated.

It seems also to be proved that the nose is not all important. Most people are affected through their noses. People with polyps, enlarged bones, infected cavities (the so-called catarrh) are more liable to infection than other people. To treat the nose will prevent some attacks and cure others.

All of this is true, yet the nose is not all important.

Hay fever can be caused by vaccination of the skin and by injection under the skin. If this information stops the use of cocain and morphin snuffs and washes for hay fever, it will have done enough good.

Dr. Clowes is working on a vaccine to prevent the disease and a remedy to cure it. A few favorable results have been obtained, but no opinion on a remedy is of any value unless it is based upon a few hundred observations.

Hay Fever Antitoxins Good.—*H. W. Z. writes: "Consideration and reply to the following questions will be highly appreciated:*

"1. Is hay fever antitoxin efficacious, and to what degree?

"2. From what is it derived?

"3. How long before the 'regular season' should it be administered?

"4. Has it any noticeable effect on the nervous system when administered, and is there any element of danger therefrom?

"5. Where can it be procured?"

REPLY.—1. There are two or three hay fever vaccines. Some of them may be antitoxins, and that, I judge, you mean. The one made from pollen has been in use longest. Dunbar's statistics show a good degree of efficiency. Those made from bacteria are newer. Their advocates publish favorable results.

2. As indicated above, some are from plant pollens and others from bacteria.

3. It is best to begin several months before and increase the dose gradually. However, they are used after the attack has begun.

4. There is no harmful effect on the nervous system. Those of the remedies that consist of the serum of injected horses are dangerous when used in full strength on people who get asthma when around horses. There may be some danger in the use of bacterial vaccines.

5. Your druggist.

Causes of Hay Fever.—*O. R. S. writes: "What causes hay fever? Is it a sign of physical weakness? I go away every year for four or five weeks. I plan while gone where to go the next year. I weigh 200 pounds and am always able to eat and sleep well, but the thought of hay fever is constantly on my mind. Am I in any physical danger?"*

REPLY.—Hay fever does not mean physical weakness. It occurs in nervous people. It is quite liable to occur in neurasthenics. The immediate cause is the pollen of some plant. You are in no more physical danger than if you did not have hay fever.

Hay Fever Cures.—*N. A. S. writes: "What causes hay fever, and is there any cure for it? Have been told that it sometimes develops into asthma. Is there any truth in that statement?"*

REPLY.—1. Hay fever results from infection with germs or with pollen. Certain types of nervous people are more susceptible than others. People with certain nose conditions are more susceptible than others. As to cures, yes, several—(a) the climate cure; (b) the serum cure, so called.

2. Yes.

CHAPTER VIII

Pneumonia—Pleurisy

TO AVOID GRIP AND PNEUMONIA

The newspapers tell us that we are in the midst of an epidemic of grip and that everybody is sick. Bad colds, pneumonia, and grip prevail, according to the reports. The vital statistics report shows a considerable increase in deaths from all causes in Chicago. This is a fairly good sign of an epidemic of grip. When grip, pneumonia, or colds are bad the death rates from all sorts of seemingly unrelated diseases go up.

Neither grip nor colds are reportable. Reporting pneumonia is not the custom, so the only signs by which to judge are the reports of general death rate and the newspaper stories.

In 1891 there was a fearful epidemic of grip. At that time the grip bacillus was found in the sputum of most of the cases of colds, bronchitis, and pneumonia. Between 1907 and 1911 the Chicago Health Department rarely found the grip bacillus. I do not know whether the grip bacillus is now being found, but I am willing to venture the guess that it is not. It would be just as well to drop the term grip and to speak of this epidemic as one of colds and pneumonia.

Assuming that the reports are correct, and we are in for a nation-wide epidemic, is there anything a person can do to protect himself? The answer is yes.

The most important thing is to keep out of crowds. Whenever a man goes into a crowd there is a reasonably good chance that he will get close to somebody capable of infecting him. The person capable of infecting him may not be sick. As there is no way of knowing who is an infector, the safe policy is to avoid crowds. As a further factor a crowded place is very liable to be an ill-ventilated place. The air probably will be too hot, too dry, and too dusty.

The second most important admonition is to keep away from people known to have colds.

Next in importance is that colds be nursed. It is good judgment to go slowly when one has a cold. During the fever stage it is well to remain in bed. After the fever stage has passed, the better one guards against fatigue and exposure the less the danger of pneumonia and other complications.

Ordinarily diseases do not run into each other, but there is reason for believing that neglected colds do run into pneumonia. Bacteriologists have shown how pneumonia cocci, at first incapable of getting into the blood, after a few days in the throat become changed so that they can enter the blood stream and be carried to different parts of the body.

Next in importance is the injunction against drinking. Whisky and every other form of alcoholic drink is a pneumonia begetter. Alcohol lowers the fighting defenses of the human body against all forms of disease, but especially against pneumonia. This has been proven by careful scientific tests. It is a universally recognized clinical fact. This is one of the points on which the laboratory men and the practicing physicians are in full accord. If an ordinary man gets pneumonia the chances are three to one that he will get well. Whisky drinkers who get pneumonia do not have a three to one chance for life.

The next admonition is against gorging with food. We hear every little while of some person who has eaten a very heavy meal and gone down with pneumonia less than a day afterward.

Next in order is the oft-repeated advice to keep the air in the living rooms fresh, clean, and cold. At this point a friend came in and asked to add a word of advice. For many years he has taken a cold shower every morning, regardless of the temperature. He has not had a cold for forty years. His advice is that all who are strong enough to get up a good reaction should take a morning cold bath.

PNEUMONIA

While pneumonia outranks all diseases in the number of deaths which it causes, in point of importance it holds second position. Most people have it at least once during their lives. Many people have it more than once, and some more than twice.

Men are far more susceptible to pneumonia than women, but the attacks are usually less severe and less fatal. Foreigners are more liable to the disease than natives, and negroes than whites. Negroes and foreigners are more liable, perhaps, by reason of their disregard for hygiene and on account of overcrowding and density of population.

It is also noticeable that people living in country districts are less liable than city folk. Inasmuch as they spend most of their lives in outdoor work, it would seem but fair to conclude that poor sanitary conditions, overcrowding, and bad ventilation are more important factors to be reckoned with than climate.

Pneumonia is the most widely spread disease in the world. It is less prevalent at the poles and the equator than in the intervening territory. In Chicago, for instance, it is an endemic at all seasons of the year.

More than 50 per cent of the people in Chicago have pneumonia once between the nursery and the grave; almost one-eighth of the people have tuberculosis.

Pneumonia is, therefore, about four times as prevalent in Chicago as consumption. From an epidemiological and medical standpoint pneumonia would appear to be most important, while from a sociological standpoint consumption is most important.

Pneumonia is no respecter of age. It attacks alike the babe in the arms of the mother and the octogenarian. In fact, it is during these extremes—childhood and old age—that the mortality from this disease is highest.

Pneumonia seems to have an especial liking for the rich. This is due,

perhaps, to the fact that among the rich are to be found the idle, the obese, and the plethoric men and women.

However, excesses in eating, drinking, and inactivity are somewhat offset by the splendid hygiene of their homes, when compared with the prevalence of the disease in the insanitary and unhygienic homes of the poor and less fortunate.

Pneumonia is a preventable disease. It is also a contagious disease.

It will be wise during the winter and early spring months to avoid

Chicago Health Department.

FIG. 20.

catching cold as much as possible, since colds are usually the first steps toward contracting the disease.

One should avoid people who have colds and who do not have extraordinary regard for others when coughing, especially in large crowds and in crowded street cars and other inclosures that are ill-ventilated.

If brought in contact with a person who is constantly coughing and sneezing it is just as well, when possible, to move to other quarters. These people many times throw off the germs that cause the cold. They may also throw off the germs of pneumonia.

If one happens to be within the field of activity of these germs he becomes infected. He may catch only a cold. He may contract pneumonia.

In either case a trouble has been negotiated that may be difficult of solu-

tion. This is a danger then that should be studiously avoided. If physical efficiency is high, one may escape both.

A man may catch pneumonia from himself. In other words, we carry around with us constantly the germs which cause the disease. They are nearly always to be found lurking about in the mouth, nose, around the teeth, and in the throat. Hence the importance of avoiding colds.

Keeping the mouth and throat clean by having proper regard for hygienic and sanitary conditions, then, becomes a means for lessening the chances of contracting pneumonia. By this means we maintain, as nearly as possible, a healthy condition of the mucous membrane which makes it more difficult for the germs to propagate their kind.

Where there is an enfeebled condition of the system resulting from cold and many other diseases, such as indigestion, Bright's disease, diabetes, bronchitis, or intestinal diseases, pneumonia is most likely to be a serious complication. When brought down with any of these diseases, it not infrequently happens that pneumonia is the disease that comes along and puts in the final stroke toward placing our names upon the final roll call.

It is particularly important to keep the bodily resistance up to a high point of physical efficiency if we would avoid contracting pneumonia.

To accomplish this it will be necessary not to overeat, not to allow ourselves to become obstinately constipated, and to avoid as much as possible irritation of our nervous system by useless worry and loss of sleep.

The use of stimulants to any great extent, of course, is positively interdicted.

These warnings are especially true in cases of obesity, as the heart already has its full measure of work to do in pneumonia. It is the one organ that is excessively overworked by this disease. It is the one organ in the treatment of this disease that must be nursed to avoid a fatal termination.

Most people have a rather clear and correct impression of the disease. As far back as the fifteenth century Fohne tells us that "the people of Switzerland referred to pneumonia as the stitch, Alpenstitch, malignant stitch, and putrid stitch; that cases occurred almost every year at the melting of the snows, and particularly when the damp winds were blowing strong; that these cases were sometimes sporadic and at other times small epidemics."

The stabbing pain in the chest, the quick, rapid breathing, the cough, the rusty and blood-stained sputum are unmistakable evidences of this disease of the lungs. Its curious onset with chill, pain in the side, followed by rapid rise in temperature and difficult breathing, mark it off sharply from all other diseases of the chest and lungs.

Epidemics of pneumonia have occurred in all countries, according to the history of the disease, as chronicled by many writers. Italy, Germany, and England were visited by epidemics in 1564, according to Hirsch and others.

Practically all countries of the habitable globe have suffered from epidemics of this disease at different times and in different sections of the country.

Illinois, for instance, has been visited by epidemic pneumonia, and because of its viciousness business became paralyzed. Large numbers of people became sick, and the disease swept down upon family after family.

While the germ is the exciting and active cause of pneumonia there are

many contributing and predisposing causes. Statistics show that there are marked exacerbations during certain years, and that in countries where the twelve months of the year can be spent out of doors, there is an absence of the pneumonia.

Fatigue, anxiety, poverty, and debility predispose to attacks during an epidemic. Insanitary and unhygienic conditions, especially where there is overcrowding, want of ventilation and accumulations of filth, act as predisposing causes.

In many extensive outbreaks it has been found that those sections suffered most where sanitary and hygienic conditions were worst. This is especially so in prisons, barracks, and on sailing vessels.

The poorer classes usually suffer far more than the wealthy. Bad hygiene in the workhouse and factory, exposure to the inhalation of irritating dust, long and unavoidable fatigue, are contributing causes.

Much has been written about the influence which climate, weather, and soil have in spreading pneumonia. One thing would seem sure—that the state of the weather would many times have much to do with physical efficiency, and physical efficiency surely has much to do with whether or not the pneumococcus is going to be able to find a lodging place in a particular person's lungs or circulation.

Concerning the meteorological influences as a causative factor in pneumonia, Anders has the following to say:

"First, that the seasons exert a marked effect upon the prevalence of lobar pneumonia, the maximum mortality being observed during the winter and spring months.

"Second, that insular climates probably manifest the greatest rise in pneumonia mortality in winter, while that of the continental climates coincides mainly with spring.

"Third, that the mortality of the epidemic form of the disease is, to a less extent, influenced by the seasons, and that it may occur in the fourth and even third quarter of the year.

"Fourth, that an apparently close relationship exists between periods of low temperature and the death rate from pneumonia.

"Fifth, that the mortality rises and falls with the barometric pressure, the maximum being reached during periods of highest pressure and vice versa; that the barometric pressure, however, is governed by the temperature, being inversely to the latter, is to be recollected.

"Sixth, that the average velocity of the winds and the death rate from this disease would appear to stand to one another in relation of cause and effect (a provisional explanation of this fact being found in the controlling influence exerted by the winds upon temperature and barometric pressure).

"Seventh, that the coincidence of existing low temperatures, high barometric pressure, the direction and velocity of the winds, and the maximum mortality from pneumonia is so uniformly constant as to merit serious consideration, and suggests a close and direct relation between their combined influence and the progress of mortality from pneumonia.

"Eighth, that the mean relative humidity of the atmosphere shows equally decided variability during the periods of abeyance in the prevalence and fatality of the disease with that of the cold or annual pneumonia season.

"Ninth, that the major influence exerted by the seasons, however, is probably not direct (e. g., by a lowering of the bodily resistance due to low temperatures, high barometric pressure, direction and velocity of the winds, etc.) but indirect, namely, by bringing about that effective element in the causation, concentration, and increased virulence of the specific poison in consequence of closed doors and windows and lack of free ventilation."

PNEUMONIA AND DRINKERS

Fat people and heavy drinkers are afraid of colds and pneumonia. On the one hand, they are more subject to infection, and, on the other, infection is more dangerous to them than to lean people or to those who are habitually temperate. Their fears are justified. There is more than one reason for the hypersusceptibility of these groups.

LEADING CAUSES OF DEATH, TOPEKA, 1912.
(Rates per 100,000 Population.)

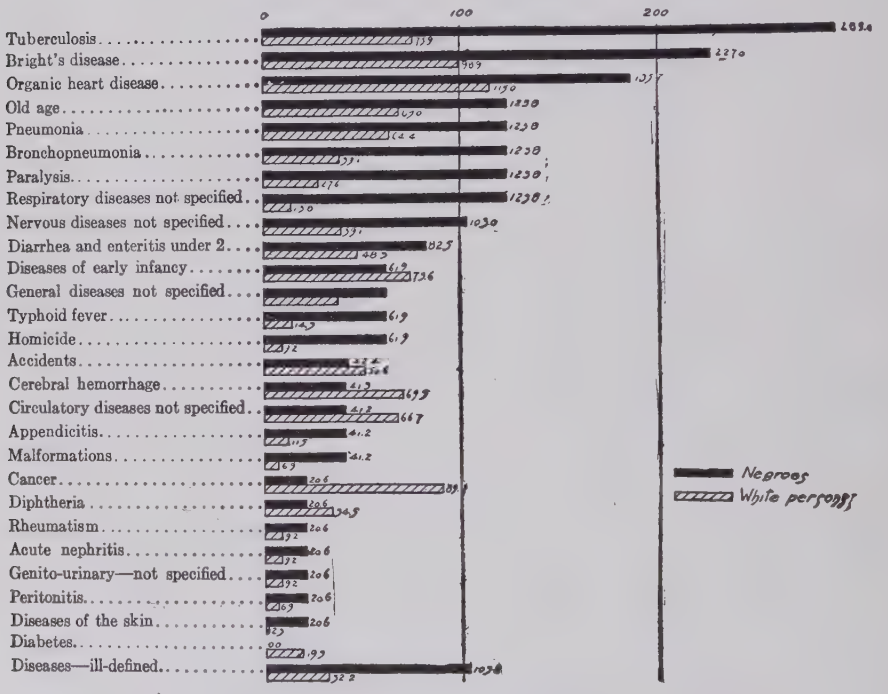


FIG. 21.—RUSSELL SAGE FOUNDATION REPORT (By Schneider).

The human animal at best has not a capacious nose. Its passages are large enough in healthy children, but, by the time adult life is reached, certain bones are larger and the airway is smaller. In fat people, this normally small space is further encroached on by fat. Not being able to get enough air through the nose they take in a good deal through the mouth. They are notorious snorers. Mouth breathers and partial mouth breathers are more subject to colds than nose breathers.

Fat people and alcoholics are badly out of nutritional balance, hence they are unduly subject to colds and pneumonia. What frightens them more, these conditions go hard with them. When a person is fat his system is cluttered with an excess of food which is stowed away under the skin, around the heart, anywhere to get rid of it. When food and alcohol are taken together, the alcohol is burned and the food clogs the tissues just as the oil burns out of a lamp wick and leaves the wick nearly as it was.

When the obese or drinking man, or the two in one, finds himself with pneumonia, he is poisoned by the toxins of pneumonia plus an embarrassing amount of food and drink but partly changed into compounds ready to make tissue. Pneumonia at best is a hard fight. The fighting forces of the sick man hardly have a fair chance when they are further burdened by these incumbrances.

If the muscle fibers of the heart are obstructed by fat they cannot work as advantageously as when they are clean. And finally, the man who has learned to lean on alcohol has not much in reserve for this trial of strength.

Obese people and alcoholics do not have the same chance to recover from pneumonia as others. This does not mean that they stand no chance. It means that the proportion of recoveries to deaths, instead of being six to one, is only two to one.

COLD AIR AND PNEUMONIA

The pneumonic should be taken care of either in the open air or else in a cold room, according to the season of the year and the climate. He sometimes objects mightily when his physician tells him to throw away poultices, flannel jackets, and steaming teakettles, to throw open the windows, and let the cold air blow right across the bed, when the room temperature is so cold that the nurses have to wear wraps; and yet in a room where the temperature is 45° to 50° and the air is fresh, the pneumonic finds the best chance in his fight.

This plan has been in use long enough to have demonstrated its efficacy. The modified open-air treatment of pneumonia is as logical as the open-air treatment of consumption. The fresh-air treatment is not a complete treatment. Rather it is the basis on which treatment must be founded. Pneumonia is a fight disease. There is an intense poisoning by bacteria and a violent fighting back by the human body. The fever, the cough, and the other symptoms are the smoke of battle. Fresh, cool air gives the human fighter vantage ground. The work of the physician is so to guide the patient that he is freed from any load which cumbers him in the fight.

WHAT TO DO AFTER PNEUMONIA

When a person has just recovered from pneumonia he wants to know what he shall do. During pneumonia the blood clots more readily than normal, hence the pneumonic patient must be moved with care that a blood clot may not break away and float off to an area where it would do great harm. He must exercise a similar precaution to prevent his very flabby, weak heart from stopping suddenly.

The fever having gone down, the patient rapidly recovers unless there be an infection somewhere besides that in the lung. Clearly, the rapid improve-

ment in the patient who is due to get well is because his system is making an anti-toxin which destroys the toxin of the coccus, or else it is making something which destroys the coccus itself. Nevertheless, sometimes a group of cocci in the heart or pleura or in a joint may go on doing harm after the crisis of pneumonia.

The kidneys bear the brunt of pneumonia about as much as the heart does, and a fair part of the people having Bright's disease should date their trouble back to an attack of pneumonia.

Generally speaking, convalescent pneumonia patients recover promptly. Their lungs are not weakened or changed in any way or any more susceptible to infection with consumption than if they had had no pneumonia. The late effects of pneumonia are to be looked for in the heart and kidneys.

During the attack of pneumonia the sputum must be disinfected by burning. But it is much more important to know that, after recovery, pneumococci remain in the mouth secretions indefinitely. The convalescent should have his teeth cleaned; his tonsils put in sanitary condition, and in addition he should be careful about spitting, for probably in spite of everything he can do he will remain a pneumococcus carrier. Not infrequently he reinfects his own lungs months or years later. It is due to this rather than to crippled lungs that pneumonia frequently recurs. A man has been known to have it more than a dozen times. So far as we now know the way to stop such recurring attacks is to make the most thorough effort possible to clean up the mouth, teeth, and throat.

PNEUMOCOCCI ELSEWHERE THAN IN THE LUNGS

The idea is more or less general that, when pneumonia follows a cold, the disease has spread along the surface of the air passages from the nose to the throat, the larynx, and the lungs. As a matter of fact, when things get just right, the pneumococcus gets into the tissues and then into the blood, and from the blood it is carried to the lungs. It is easier to make the cultures of this germ from the blood than from the sputum.

When the main effect of the pneumococcus is found in the lungs, the disease is called pneumonia. But the pneumonia germ can be carried to other parts of the body, and, locating there, cause disease. In some instances the coccus sets up changes in other organs at the same time as it does in the lungs. Sometimes infection of other organs follows infection of the lungs, and sometimes the germ locates in other organs and does not affect the lungs.

The pneumococcus is one of the more frequent causes of heart disease. It causes 56 per cent of the pleurisies where there is pus; 17 per cent of those where the fluid which is drained away from the chest is a clear water. It causes a large part of the meningitis. A pneumococcus meningitis looks much like the epidemic form.

A rather famous case of meningitis which came on in a girl who had been vaccinated was caused by a pneumococcus infection of her brain through her nose. Many of the inflammations of the joints called rheumatism are pneumococcus infections and it is these which are most liable to result in stiff joints.

The diseases due to pneumococcus vary greatly in their severity. For

instance, pneumococcus infection of the lungs is, next to tuberculosis, the most virulent of the usual infections of the lungs. Pneumococcus infections of the pleura are about the most curable kinds of pleurisy.

We get a better idea of the pneumonia question by knowing of the other diseases which may be due to the germ of pneumonia and how the coccus varies in virulence in different parts of the same body—just as we have long known how it varies in different people.

A POSSIBLE PNEUMONIA CURE

For years physicians have been trying to find a cure for pneumonia. It was plain that digitalis, nux vomica, carbonate of ammonia, guiacol, whisky, and the old lot of cures were ready for the same scrap heap as bleeding. In fact, time has demonstrated that a certain group of pneumonia cases were helped by bleeding, and in consequence there has been some revival of bleeding. Relief in some stages of some cases of pneumonia will result from the use of ammonium carbonate, guiacol, digitalis, or the other, but they are not cures in any proper sense.

These latter-day studies have been on the pneumonia coccus. When this coccus was discovered it soon developed that it did not grow well on the foods for germs commonly used in the laboratories. After a few days of feeble growth it always died. In consequence study of the pneumococcus lagged. Laboratory men knew the consumption germ and the diphtheria germ like books, but the pneumonia germ was undiscovered country.

In time a better food for this germ was found and the study of it began. Some facts were discovered that seemed to point a way to a remedy. It was found that when a mass of pneumococci were washed in weak salt water most of the poison was washed out of them. The washed germs had a slight power to produce fever and to harm the subject, but on the other hand they seemed to have great power to stir up the defensive forces of the body. Finally it was possible to get the cocci washed so clean that two teaspoonfuls of a suspension of them would not kill a guinea-pig when injected into its veins.

For three pneumonia seasons Dr. Rosenow has been using this method of treating pneumonia. Of thirty patients treated this way by physicians in private practice three died—10 per cent. In a hospital group of thirty-five cases in 1910, nine died—25.7 per cent. In the next group were 294 cases treated in Cook county hospital. One hundred and forty-six received the injections—148 did not. All other treatment and care was exactly the same. The cases were not selected. The death rate in the noninjected group was 37.8 per cent (fifty-six deaths); the injected group, 23.3 per cent (thirty-four deaths).

An injection of about 15,000,000,000 cocci was made the first day in the hospital. It was repeated each day. After the first injection there was a rise of fever of a degree or two, but after that the fever declined and it disappeared a few days earlier than is usual in pneumonia.

It is most important that the treatment be begun early in the disease. The results are best when the injection is given the first day. Each day of delay lessens the chances of cure.

In order to form a correct opinion of the value of any treatment it is

necessary to have a number of cases. Among young, healthy, clean people at least three out of every four ought to get well with any treatment. The only way to judge of whether a remedy is in the 40 per cent class or in the 20 per cent class is to study enough cases.

Dr. Rosenow does not yet know the value of this proposed remedy. In one of his articles he tells how to make it, what it contains, and how to use it. He thinks it will be especially valuable when given to nonalcoholics immediately after the pneumonia chill.

He offers it free and has written about it prematurely in the *Journal of the American Medical Association,* because he wants family physicians to give it a trial and send in the records of the cases, that a better opinion of its value or lack of value may be had.

Pneumonia and Air.—*Inquirer writes: "It is said that hack drivers suffer more from pneumonia than any other class. If this be true why is pneumonia considered essentially a bad air disease? It is steadily increasing from year to year in the rural districts, as it is said to be in the cities."*

Reply.—1. That pneumonia is an impure air disease is amply proved by its greatest occurrence during the months when houses are generally overheated and a good many overcrowded.

2. Pneumonia occurs with greater frequency in cities.

I know of no proof that cab drivers suffer more from pneumonia than any other class. I do not think that they do.

PLEURISY

The pleura is slipped in between the lung substance and the chest wall. It is put there to prevent friction. It is the ball-bearing of the lung. It is a delicate structure, so delicate that it is not easy to see. When the lungs are removed and superficially noted the surface is smooth and glistening. There must be a membranous covering present. It is so delicate that the anatomists, before the days of the microscope, could not make it out well.

When the inside of the chest wall is examined another smooth surface is noted. This pleura must have two layers, one covering the lung and the other lining the ribbed chest wall.

The anatomist cannot outline it well without his microscope. It is not necessary to take the word of the anatomist for this. If you will try to strip off the shiny lining of a chicken's chest, or of a piece of rib pork, or of ribs of beef, you will find that this delicate layer is so thin that it will not strip.

This pleura covers the lungs everywhere. Likewise it lines the chest everywhere. It lines the bony part of the chest wall and also the muscular wall, called the diaphragm, which divides the great body cavity into two—the abdomen and the chest.

In this little more than microscopic membrane, the pleura, are located nerves, blood and lymph vessels. It is, in fact, provided with its own supply of these, separate and apart from the supplies on the one hand to the lungs and on the other to the chest wall.

The reason is that this pleura is a buffer as well as a ball-bearing. Cancer, consumption, and other enemies cannot shoot straight across from the

skin to the lungs, or vice versa. They do get across sometimes, in time, but they must stop at the pleural barriers and give the countersign. They must cool their heels in the antechambers. Most of them give up in disgust.

We may say then that the pleura has two jobs—the ball-bearing job and the buffer job.

I understand that cable, telegraph and telephone companies have instruments with which they can accurately locate trouble on the lines. A cable operator can hitch an instrument on a cable line and tell that the trouble is 2,037 miles out. A telephone operator can hitch in a locater and find out just where the trouble is located.

The nerves are exact duplicates of cable, telegraph, and telephone lines. The ordinary nerves correspond to insulated cables; the sympathetic nerves to ordinary exposed uninsulated wires. Some of the nerves are well trained to local impulses; some of them are poorly trained.

The best trained are in the palms of the hands and especially those of the tips of the fingers. If the tip of the finger is touched by two pin points the finger registers two points, even when the pin points are close together.

On the back of the hand the two pin pricks are registered as one, even though the points pricked are half an inch apart. On parts of the body the nerves are so poorly trained that they cannot distinguish two pricks even when the two points are held inches apart.

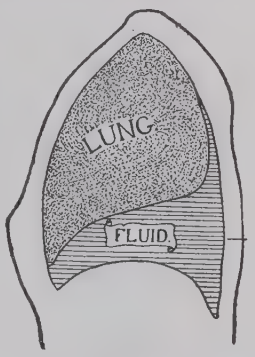


Fig. 22.—Pleurisy with Effusion. A considerable quantity of fluid is pressing the lung upward and forward.

You can learn something by trying the training of your nerves in different locations on your skin. The nerves of the skin at that are much the best trained nerves of the body.

The nerves to the pleura are so poorly trained that the hurt never shows just where the trouble is. This is especially true when the affected part of the pleura is some place on the diaphragm. Some men with diaphragmatic pleurisy will feel their pain in the appendix; others in the gall-bladder; others in the kidney, and others in the stomach.

Ordinarily it is pain in the ribs that makes a man think he has pleurisy. This catch in his side may be due to muscular rheumatism in the muscles of the chest wall, to neuralgia of the nerves that run between the ribs, or to inflammation of the pleura.

The ordinary treatment is to put on a porous plaster and to let it go at that. That is the way the ordinary man has worked it out, and that is about the best way.

With some kinds of pleurisy, where there is no cough, no fever, and no effusion, this treatment is as good as any, provided there is free purgation. This is also true of the neuralgic pains and the muscular-rheumatism pleurisy pain.

The porous plaster makers generally put some drug in the plaster. They do that so they can call it capsicum plaster or belladonna plaster; or maybe they will even put in some hot stuff and call it an electric plaster.

The object of this is the same as the object in putting pepsin in chewing

gum. It does no harm; it does no good, but it makes a fine talking point in the advertisement.

The plaster straps the side; holds the movement down, and in this way helps to cure. Meanwhile the mind is at ease; something is being done. That also helps the cure.

These mild cases of pleurisy that the doctor is accustomed to dismissing lightly, calling them intercostal neuralgias, or muscular rheumatisms, tend to heal quickly, and leave no after effect. They are not worth much trouble.

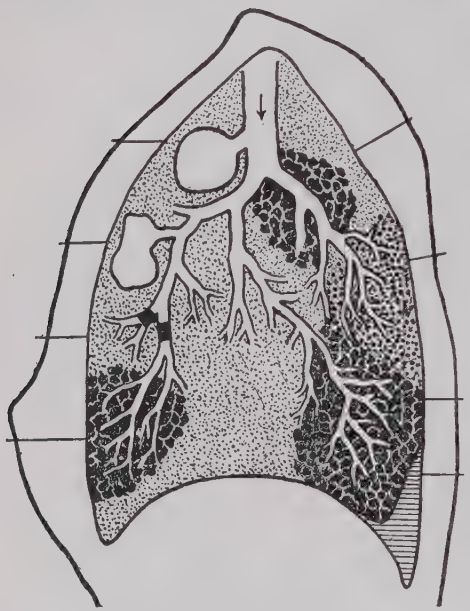


FIG. 23.—DIAGRAM SHOWING A BRONCHUS BRANCHING TO END IN AIR SACS. At the upper left are two large cavities. Sputum at the points in the bronchus at the left causes coarse dark râles.

There are forms of pleurisy that are of great importance and that are frequently overlooked. I think doctors are agreed that there are more mistakes in diagnoses in pleurisy than in any other disease.

Are there any signs by paying heed to which we can escape these mistakes?

When the pleura inflames, fluid is poured out of the blood into the tissues. As there is so little space in that delicate membrane the serum exudes from the pleura as water oozes out of wet ground.

As the serum accumulates in the pleural cavity the lung is pushed away from the chest; pleural friction is lessened; the chest wall moves less, and the lung is partially collapsed.

In consequence the pain with which the attack may have started stops or nearly stops. As a matter of fact, in the pleural cavity there may be a gallon of clear, straw-colored serum.

Is there anything to make a patient suspect? It is not my part to describe how the doctor would examine with the stethoscope and hammer. My part is to tell the man walking around the street with a gallon of serum in his chest what should make him suspect, and acting upon that have a diagnosis made.

He will notice that since the pleurisy pain he has been short-winded. He was not sick enough to be short-winded. He knows of no cause for being short-winded.

He strips the clothes from his chest. By careful observation he notes that the two sides of his chest do not move evenly. One side moves much less than the other. If it were not hooked up in the same ribbed wall it would not move at all. The space between the ribs does not fall in the same way on the two sides. In fact, on the affected side the spaces may even bulge.

Of course, if a man is exceedingly fat this point cannot be noted. If he is thin he may note that the heart beat does not show just below the left nipple, but does show to the right or left of where it belongs.

Finally he has a sense that something is wrong in his chest. Something feels tight inside one chest or the other.

This form of pleurisy is called pleurisy with effusion. The French call is *pleurésie à frais,* or pleurisy with a chill.

It is a sneaking disease. So far as the pleurisy part of it is concerned it is of no great consequence. The significant feature is that consumption so frequently starts that way.

Of the pleurisies with a clear, straw-colored effusion, these sneaking pleurisies, more than half are due to tuberculosis. Straus says 56 per cent of them; Landouzy says 75 per cent of them; Kelsch and Vaillard say 82 per cent of them.

The Bowditches of Boston have been prominent physicians there for a long time. The fathers hand down the families in their practice to the sons.

One of the Bowditches looked over the histories of their patients, especially of those families whom they had continuously cared for since 1849, and he reported that most of those who had had pleurisy with effusion subsequently showed consumption.

Osler says: "I confess that the more carefully I have studied the question the larger does the proportion appear to be of primary pleurisies of tuberculous origin."

Sometimes the pleura fills up with fluid during the course of consumption. Sometimes consumption starts with the pleural effusion. But the rule is to have the person who has had this kind of pleurisy get well and appear to be well for a year or two, and then begin to show signs of consumption.

The extremely important reason for finding out that one's pleura is full of fluid is that consumption is then present. In all probability it will not be exceedingly active for a year or more, and the disease is easily curable.

The method of cure is to change one's method of living. Two years later the disease may be so far advanced as to put the cost of cure so high that the sick man cannot reach it. By cost I mean cost in time, in rest, in money, and in those things that money can buy.

A group of cases often overlooked, though more easily diagnosed, is that in which there is fever, general aching, pains in the chest and a dry cough.

The above description reads much like an ordinary hard cold. There is but one way to tell these cases from a hard cold, and that is when the physician listening to the chest sounds with his stethoscope on the skin hears a friction sound if pleurisy is present.

If he listens to a chest covered by clothes the friction sound given will be due to the shirt rubbing on the undershirt. A physician who listens to chest sounds through the clothes obtains money under false pretenses. Some day the state's attorney will charge the grand jury to that effect.

The chance of getting well with or without medical care is fine. Much depends upon the germ which causes the pleurisy. Many of these are due to the tubercle bacilli. Those cases will get well if the patients will get busy; not otherwise.

The cases due to infection with pneumonia germs will stand a little better chance to get well than the cases of pneumonia, in which latter condition the germs have been deposited by the blood in the lungs.

The pleurisies due to the staphylococcus will probably get well. The chance is not so good for those due to the other pus cocci.

A better way to tell what the outcome will be is to put in a needle and draw off fifteen or twenty drops of fluid. If this fluid is of a clear straw color the germ is generally the tubercle bacillus. If it is a little cloudy, or is pus, the germ is probably a pneumococcus, or an ordinary pus coccus.

If the pleurisy has followed pneumonia, or has been left by pneumonia, the germ is pneumococcus. The people who convalesce slowly after pneumonia, who "don't get their strength back," who have a nagging afternoon fever, who sweat, or have night sweats, will, if carefully examined, usually be found with a pleura full of pus.

In a child this is not an extremely serious condition. Children with suppurative pleurisies, following pneumonia, generally get well. The pus may open into a bronchial tube and be coughed up, or it may be drawn off with a needle, or it may absorb. The condition is much less grave than with a grown person.

When the pleura of a grown person is found full of pus the condition is one of gravity. If the pus is white and creamy it will be found that the pneumococcus is the most frequent cause. The chance of cure of that group is better than that of the next. If the pus is ordinary the chance is that streptococcus is the cause.

Curing up a suppurative pleurisy is a most difficult process. It is easy to understand the reason.

When a boil is lanced the pus flows out and the walls fall in. This collapsing of the walls is what makes the cure easy.

When the boil is in a bone the walls cannot collapse. The suppuration goes on and on. Witness how white swelling holds on.

The chest wall is composed of bony ribs. It cannot fall in or collapse. When the pus is emptied out a cavity is left. Cavities cannot remain. This one fills up with pus again.

These cases must be cared for by the surgeon. What the surgeon does is to open up the chest and cut away the ribs. The stiff bones being out of the way the muscles cave and the pleurisy heals up, as would any other boil.

When ribs have been cut away they have a great tendency to grow back. In fact, when but little has been cut away the rib may grow back so fast as to prevent the proper healing of the cavity. If a rib was taken from Adam to be used as a basis for Eve the chance is that before the season was over Adam was around with a full supply of ribs.

Fowler's and Godlee's book contains an illustration showing how a drainage tube, left in the pleura for a few months, was found encircled by newly grown ribs like the tombstone-eating trees in the old cemetery at Jamestown, Va.

Empyema of Pleura.—*J. V. C. writes: "Please advise me regarding a disease called empyema. What is its nature? How is it contracted? How avoided? Is it difficult to cure? Is it contagious or infectious?"*

Reply.—Empyema means pus in a cavity. Generally the name specifies the location of the pus—e. g.: empyema of the gall-bladder. If you mean empyema of the pleura (or chest) the following are the answers to your questions:

1. It is a suppurative inflammation of the covering of the lung. It may be due to ordinary pus cocci, to pneumococci, to tubercle bacilli, or some other bacteria.

2. The bacteria may spread to the pleura from the lung. They may be carried by the blood. It is frequently secondary to pneumonia, consumption, or lung abscess.

3. By living a hygienic life.

4. It depends. Generally speaking, it is difficult to cure. Pneumococcus pyemia in children is cured rather easily. Pneumococcus pyemia in adults is harder to cure. Pus cocci pyemias are more difficult to cure than those due to pneumococci.

5. Practically, no.

CHAPTER IX

Consumption

FACTS ABOUT TUBERCULOSIS

The consumption situation is improving. Careful students are of the opinion that the disease is milder now than it was a century ago. When we come to the last twenty years the figures are accurate enough to permit of dependable judgment. The cities that began fighting consumption first have only half as much as when they began. Chicago began fighting it about ten years ago, and has only three-quarters as much.

CONSUMPTION CAN BE CURED

if treated in time. Most consumptives do not know they have it until too late. You may have it. Have your doctor find out NOW with a tuberculin test or otherwise before too late. The thousands of hopeless cases are due to neglect.

Fresh air prevents consumption and pneumonia. Ventilate all the time—winter and summer—day and night. "Too much fresh air is just enough."

DEPARTMENT OF HEALTH

Chicago Health Department, Jan. 8., 1910.

FIG. 24.

The national census office tells us there is a general improvement down the line, the older cities showing great improvement, the younger cities showing some improvement, the country districts showing a little loss, but not enough to neutralize the gain.

The death rate from consumption in Chicago is less than was the typhoid rate twenty years ago. The typhoid rate is not one-twentieth of the rate twenty years ago. Within the next twenty years the consumption rate will be chopped to pieces. People generally see that, and therefore they want to know everything they can about consumption.

The Relation of Inheritance to Consumption.—A few children have been born tuberculous. The child when born contained tubercle bacilli in its tissues. The tubercle bacilli were passed from an infected mother into the body of the unborn child. Such are cases of inherited tuberculosis. These cases are rare, so rare as to be medical curiosities. That is all there is to inherited tuberculosis.

As we go through life, we are attacked by tubercle bacilli from time to time. Therefore the ability to throw off tubercle bacilli is a highly important question. People have this ability in varying degrees. Some are extremely resistant; others are but little so.

Resistance is modified in different ways. We strengthen resistance by breathing fresh air, eating good food, and exercising.

The life insurance tables show that fat people have a lower tuberculosis rate than thin ones. This means that people who for one reason or another are more liable to tuberculosis than the average will lessen their chances of having the disease by keeping somewhat overweight.

Some inherit a lowered resistance to tuberculosis. If more than one-twelfth of the members of a family die of consumption the family is a consumptive family. Of course, in order to draw any conclusion at all, it is necessary to get the cause of death of at least 100.

North Carolina Health Bulletin.

FIG. 25.

Statisticians, after carefully studying family histories, have concluded that consumption does run in families. This does not mean that consumption never develops outside of these consumption families. What it means is that if a member of a consumptive family gets infected with consumption he does not have the average chance of throwing off the infection before getting sick or of getting well after the disease has developed.

Williams studied 1,000 cases of consumption and found that 488 of them belonged to consumptive families. Walsham found that the proportion was 320 out of 1,000. After we make allowance for the danger that members of a family catch the disease from one another, we see that much more than half the consumptives do not belong to consumptive families.

Walsham tells us what every physician knows: *"A man starting life with a constitution favorable to the growth of the tubercle bacillus can, by his habits and environment, over which he generally holds some control, to a large extent alter his tissue resistance to his advantage."*

In other words, a man, by carrying out the laws of personal hygiene, can be reasonably safe from consumption. If he is of a consumptive family he should be doubly careful in living. He must live right to be safe, and living right, he will be safe.

The Relation of Heart Disease to Tuberculosis.—As a general proposition those people who tend to heart disease, apoplexy, and Bright's disease do not tend to consumption. As rheumatism lies at the base of a good deal of the apoplexy and heart disease, we may also say that the rheumatics have a slightly better chance not to become tubercular than have the average.

However, if a man concludes that because he is in less danger than the average man he is in no danger, he will be in error.

Again, the heart is really four pumps set side by side, and disease of one part may have just the opposite effect from disease of another.

A learned Austrian of the latter part of the last century, Rokitansky, wrote:

"Persons laboring under enlargement of the heart do not contract tuberculosis."

Rokitansky's opinion carried so much weight that for a long time it was accepted blindly. Further analysis has shown that certain kinds of heart disease protect against tuberculosis and other kinds help to produce it.

About the most important of the valves of the heart is one known as the mitral. Sometimes this valve is diseased in such a way that the blood cannot pass easily from a cavity called the left auricle to another called the left ventricle. The condition is called mitral stenosis. Mitral stenosis offers protection against consumption.

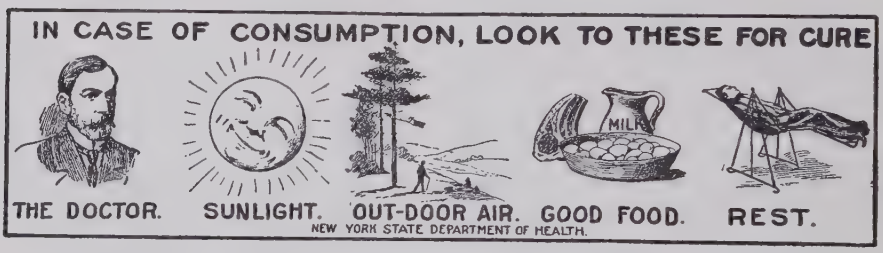


Fig. 26.

There is a valve located where the important artery, the pulmonary, starts from the right ventricle to run to the lungs. When this valve is stenosed, infection of the lungs with tubercle bacilli is apt to occur.

The Relation of Diabetes to Tuberculosis.—Diabetes is a symptom. Any one of several conditions may be responsible for this symptom. Speaking generally there is little danger of diabetes directly causing death.

However, diabetics are more liable to become infected than is the average run of men, and infections in diabetics are especially liable to be severe.

Ordinarily, boils and carbuncles are not dangerous. In diabetics carbuncles and boils are quite dangerous. A pneumonia in a diabetic is much more dangerous than in a nondiabetic.

Diabetics are prone to consumption. A young person with diabetes stands about an even chance of getting consumption.

Consumption in a diabetic runs a rapidly fatal course. In a diabetic tissue is burned much more rapidly than in a normal person. In a consumptive the same is true, though in a lesser measure.

When diabetes and consumption are combined in one patient the fires burn out the body rapidly, as a furnace in which wood and paper are burned melts out the grate bars and blisters the boilers.

The Relation of Pregnancy to Tuberculosis.—The idea is general among medical men that pregnancy occurring in a tubercular woman would cause the disease to become highly active. Walsham gives it as his opinion that "pregnancy does not predispose a woman to tuberculosis, and even when preg-

nancy does occur in a tubercular woman the complication is not a serious one, although, of course, it is a complication we would rather be without."

I have observed a number of pregnancies in tubercular women. If the women have had good care they have gone through the period without a flare-up in the disease; good healthy babies have been born, and the disease has not progressed rapidly immediately after the confinement.

I have known of cases where the baby, born in the spring or early summer, has been left at the breast until the cool weather of autumn without harm. The baby born to a tubercular mother probably will be free from tuberculosis and otherwise healthy and strong.

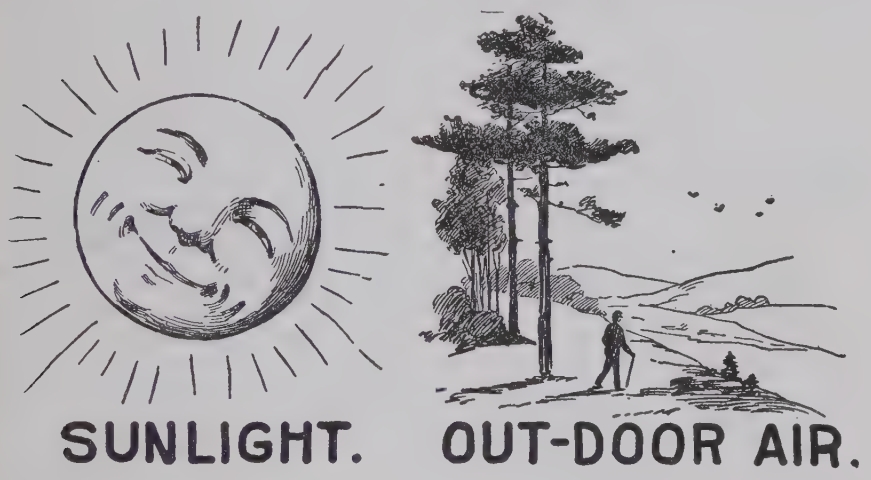


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FIG. 27.—TO CURE CONSUMPTION.

A careful mother can prevent her baby at the breast from becoming infected. The weaning of the baby is for the purpose of saving the mother's strength.

The Relation of Alcohol to Tuberculosis.—Walsham tells us that "a large section of the public believe that alcohol protects the body from the attack of the tubercle bacillus. This belief is due to the teaching of the older physicians, as the medical opinions of the public of today are generally those of the last generation of physicians. There can be no question that physicians in the middle of the last century did not consider that alcohol predisposed the organism to tubercle. They even considered it beneficial and gave it to phthisical patients in large quantities."

At the present time up-to-date physicians do not give alcoholic beverages to consumptives. Furthermore, statistics convince them that users of alcoholic drinks have more than the average amount of consumption. Addiction to drink predisposes to tuberculosis.

In addition, as Kelynack says: "There can be no doubt that the non-hygienic surroundings of many chronic alcoholics afford important conditions suitable to tuberculosis invasion."

Some years ago at Dunning, Ill., we noted that consumptive women who,

prior to contracting consumption, had been drinkers or who had been notoriously immoral succumbed rapidly to the disease.

The Relation of Chest Development to Consumption.—Many observers have noticed that stoop-shouldered, narrow, deep-chested people were prone to develop consumption. People whose chests are shoulder bound do not expand the upper part of their chests well. Sometimes those upper ribs get so ossified that they can move but little, and in breathing the upper part of the chest moves only slightly. Freund thinks this lessened movability of the upper chest is largely responsible for consumption.

The Relation of Age to Consumption.—Infants in arms are fairly subject to the tubercular infection. When the tubercle bacillus enters their bodies it is apt to locate in the lungs. Such children have ordinary lung consumption as grown people do. With them the disease runs a rapid course.

Children past the age of infancy are prone to have scrofula, glandular tuberculosis, and bone tuberculosis. In them tuberculosis is quite mild and tends to get well.

Young men and women, say from 15 to 40, are apt to have lung infections. In them the disease tends to progress rapidly.

In older people the disease is slower; the lungs are apt to harden up and the overgrowing fibrous tissue either cures the disease or makes it take on a chronic form.

The Influence of Race on Consumption.—The negro race is exceedingly liable to become infected with consumption. Consumption in a negro is liable to progress rapidly. The lungs are usually moist and much sputum is raised.

Occupation in Relation to Consumption.—There is the widest variation in the amount of consumption among the different groups of workers. The dusty trades are the worst sufferers. At the head of the list are those who work in metal and stone dust. In some lists stone cutters stand at the head; in others, metal polishers. There is not a great amount of difference.

The printer and compositor are near the top. There is not so much dust in their working place, but what is there is kicked up from a dusty floor, and there are always likely to be consumption germs in floor dust. The printer works in an ill-ventilated room, which makes a little dust as harmful as a larger amount would otherwise be.

The cigarmakers are usually fourth on the lists as printed. Janitors stand near the top.

In Pittsburgh they claim that coal smoke makes for pneumonia but that it makes against infection by consumption. They say the solid particles of unburned coal fill up the lymph spaces in the lungs so that consumption germs cannot get in.

WAR AGAINST CONSUMPTION

In the United States the consumption death rate is falling in a dozen or more cities, but in the country at large it is not falling. New York and Boston have cut their consumption rates in half. Many other cities have done well, but not so well as the cities named; and the rate in the rural districts is increasing slowly.

In Germany, prior to the insurance period, the consumptive rate was

stationary. Soon after insurance was begun the rate began to fall. The rate for all Germany has fallen from 3.25 per 1,000 to 1.65. The rate for German cities fell from 3.1 to 2.2 in 1897, when the anti-consumption crusade of the pension boards began. Since then the fall has continued until now the cities' rate is lower than the rural rate.

Dawson quotes Professor Kayserling of Berlin and Professor Frankel, who rank among the highest German authorities upon the subject, as attributing the progress made "more to the industrial insurance laws than to any other cause, owing to the fact that these laws have placed within the reach of the working classes sources of healing which were never dreamt of before. . . . There is little room for doubt that, before many years have passed, this scourge of the race will be robbed of its terrors and take its place as one of the minor afflictions of mankind."

GOOD FOOD.

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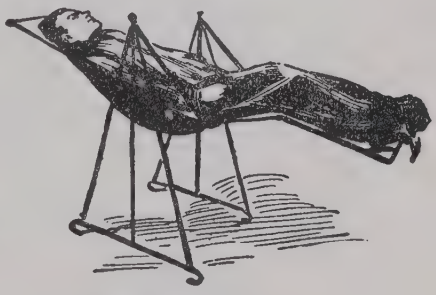
FIG. 28.—TO CURE CONSUMPTION.



REST

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FIG. 29.—TO CURE CONSUMPTION.

Professor Kayserling also says: "We will conquer this disease by [a] recognition of the fact that we have to deal with a specific infectious disease caused by the tubercle bacillus, and by [b] the largest possible development of treating tuberculosis by means of the machinery of industrial insurance."

Nor is the effect of these measures limited to tuberculosis. "It seems impossible to deny to insurance legislation some credit for the fact that, during the last twenty-five years, the rate of mortality for the whole empire has fallen from 25.4 per 1,000 to 19 for the last ten-year period and 16.2 for 1910.

"In Germany the contention is general that the effect of the insurance legislation and of the various activities to which it has given rise has been marked improvement in the physical, mental, and moral condition not only of the insured but of the poorer section of the population, and this improvement is reflected in a higher standard of civilization and of economic efficiency."

The authorities seem agreed that an improvement in the efficiency of men has been one of the noticeable consequences of the better housing and better public health resulting from these laws.

EARLY DIAGNOSIS NECESSARY

Early diagnosis is the heart of the consumption question. Consumption, diagnosed in the early stages, is curable in nearly every case, and, what is just as important, cure can be brought about with the expenditure of so little time and money that it is within the reach of nearly every one.

On the other hand, late consumption is not often cured. Part of this is because the disease in that stage is hard to cure, and part of it is because the time and money required put the cure beyond the reach of most people.

The cure of consumption by fresh air, rest, and feeding, while the best cure we have, is far from being perfect. When scientists have discovered a better cure there will no longer be so great a premium on early diagnosis. After that, men can go along foolishly saying, "There is nothing the matter," saying, "Thinking consumption makes consumption," trying in every way to deceive themselves, and still be cured.

WHEN TO SUSPECT CONSUMPTION

The earliest sign of consumption is unwarranted tire. This is always very suggestive of consumption, but it is also suggestive of many other condi-

FIG. 30.—A CAREFUL CONSUMPTIVE.

tions. This symptom would have qualified Napoleon Jackson, "who was marked for rest." It would qualify those who suffer from hookworm, to say nothing of a good many other ills, some of which are of no particular importance, while others are.

If the person who suspects he has the disease will take his temperature four times a day for a week or more, he will find a morning drop to a little below 98½ and an afternoon rise to a little over 99. The range of temperature is not conclusive proof of the disease. It is suggestive only, but it is a more reliable sign than the rundown feeling.

Both of these symptoms come before the cough appears, and, of course,

weeks before bacilli can be found in the sputum. They bespeak an easily curable stage of the disease.

Cough follows a little after the onset of the infection in the nose and throat. The consumption cough is much more liable to sneak in without aches and pains. This symptom, too, is suggestive only. There are other causes for a slowly developing, persisting, mild cough. By the time the cough comes the disease has progressed far enough for a fairly good diagnostician to find evidence of it in the chest by a physical examination.

There is another suggestive circumstance that is of great importance. That is a history of having been thrown in close contact with consumptives.

If a member of one's family has recently had an open tuberculosis, spitting tubercle bacilli or having a wound or sore throat discharging them; if one has worked recently by the side of a spitting consumptive; if one has been drinking milk from cows proved to have had consumption—such a personal history is just as suggestive as the feeling of tire, or a little range of temperature, or a little cough. Any one of the four suggestions brings two bits of advice: the first that, whatever in the method of living is insanitary or unhygienic be changed; the second, that effort be made to get a diagnosis.

WHAT CAN THE CONSUMPTIVE DO TO BE SAFE TO OTHERS?

The consumptive starts out with an infection located in one part of one lung. If he is not to harm himself he must not infect other parts of his own body. He starts out as the only case in his home and his office. If he is not to harm his fellow man he must not infect his surroundings. How can he earn security for himself? How can he earn security for his fellows?

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FIG. 31.—A CAREFUL CONSUMPTIVE. (*See* Fig. 30).

In order to prevent infection of other parts of the infected lung and of the other lung it is necessary that sputum should be cleared out of the lungs just as soon as it comes in coughing reach. But coughing which does not produce sputum jerks the lungs and thus harms them and forces bacilli into new areas in them. Therefore, there should be enough coughing to empty the lungs, but no more than is needed for this purpose.

The throat must not become infected. The cough must keep the vocal cords clean, but it must not be hard enough to hurt them. The mouth must be kept scrupulously clean. So must the teeth, the tongue, the tonsils. Sputum must not be swallowed, because tubercular ulcers in the intestines very nearly end all possibility of cure.

Pneumonia and common colds must be avoided by keeping in the open air and avoiding people who have colds.

The man must not infect his family or his work fellows. First of all, he must not cough or sneeze without holding a napkin or handkerchief in

front of his face, so that no mist may be thrown into the air. He must not spit either the sputum or ordinary spit on the floor, the wall, the bed, or anywhere except into a napkin or some receptacle, which in turn must have proper care. He must not kiss those susceptible to the disease. He must have his own eating and drinking utensils. He must not handle the food of others. He must be careful that he does not stay long in badly ventilated places, nor in places where sunlight does not reach.

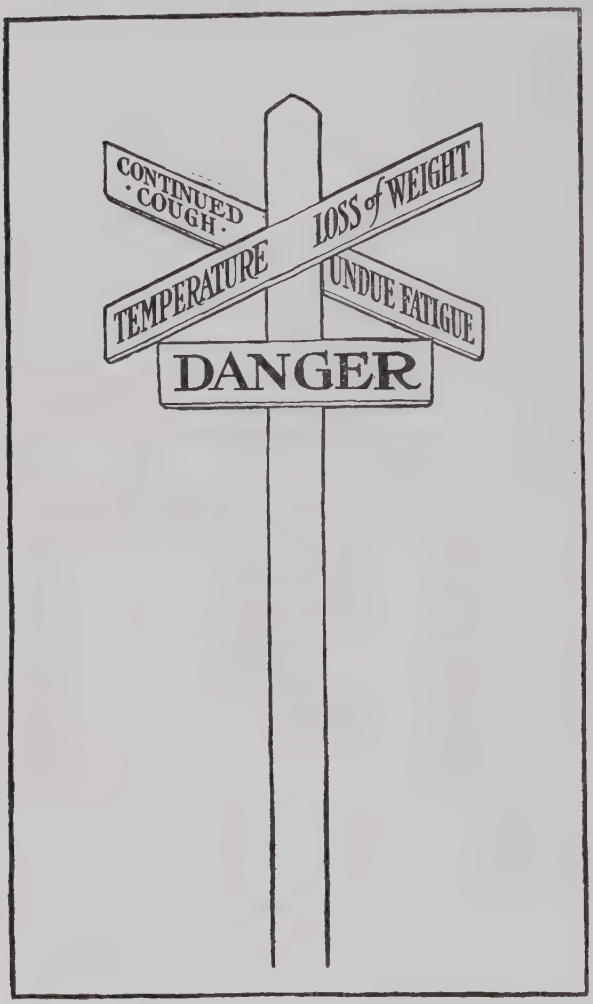

Fig. 32.—Look Out for Consumption.

It is difficult to infect a well-ventilated, sunlit room. He must not work at a dusty trade.

Following these few simple rules, he is a good neighbor and a good fellow workman. As an associate he is safe and he should be allowed an opportunity to work and to enjoy himself. On the other hand, a reckless consumptive should have fewer rights than any other man. He is an enemy to his fellow man. *Perhaps more of charity and humanity would decrease the number of community enemies.* How often a consumptive gets careless and reckless, bitter and vindictive, because he believes that consumption is a sin of society and that he is being made to suffer unjustly. He grows resentful and strikes right and left, or maybe, tired and worn, he ceases to care for men because he thinks that no man cares for him.

WHAT IS THE CONSUMPTIVE TO DO FOR HIMSELF?

There is no cure for consumption in the sense that diphtheria antitoxin is a cure for diphtheria, or even in the sense that quinin is a cure for malaria.

When antitoxin is injected it searches out the diptheria toxin, neutralizes it, and leaves the tissues of the body untouched. When quinin is taken for malaria every tissue in the body is poisoned, but the malaria organisms are poisoned so much more than any other cell that the result, in a certain sense, is specific.

For tuberculosis we have tuberculin. This carefully used over a long time builds up the resistance of the body to the toxin of the tubercle bacillus, but not to the bacillus itself. Certainly there is none of the magic effect seen after diphtheria antitoxin is used.

The present consumption cure consists in building up the resisting forces. They then fight back in a general sort of way and as the tubercular process is the most evident force at which to strike, the quickened resistance strikes at it.

It is as if a sleeping giant had been half awakened to a sense of danger, and, simultaneously, to a desire to fight back. The monster lunges out against whatever is at hand. It may fight against the enemy. It may waste its force in a futile struggle. The elements of cure are rest, food, and fresh air.

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Fig. 33.—A Careful Consumptive.

One of the best books on curing consumption is "My Personal Experience with Consumption," by Ross. In an article in the October number of the *Journal of Outdoor Life,* Ross says:

"The day's work should consist of rest; rest should be the only business on hand. . . . The error that many fall into is in confusing rest with some of the many forms of recreation. Hence, it is necessary that we 'standardize' our meaning of rest to fit the case of the person suffering with tuberculosis. The matter is an important one, equally as vital as the proper regulation of the other requisites of the cure, for it has been very clearly demonstrated that the cure depends not on any single one of the major necessities, 'fresh air, wholesome food, and rest,' but on all of them, sensibly applied and regulated."

As a matter of fact, the need is that the patient be told just how much to rest, just how to rest, and just what is rest. In his book Ross says:

"Resting is a severe test upon one's patience. It will be taxed to the utmost again and again. The real battle is taking place at this point. Getting well requires the exercise of many of one's powers, and foremost of these is patience and restraint. The development of these two faculties will save much energy, every ounce of which is needed. A large percentage of those who have not been cured might have been had they learned to rest in the proper manner during the curative period."

HEADING OFF CONSUMPTION

Whenever close association with a consumptive, or lassitude, or fever, or cough has made one suspect that he has consumption, the proper course for

him to follow is to find out if he has the disease and if so to adjust his life so as to fight it successfully, and, if he has not, to dismiss the subject from his mind.

Nothing could be more asinine than a policy of dread of the disease so great that one is afraid to investigate and inquire, afraid to know the truth. Such a policy means a foolish drifting into breakers from which there is no escape.

The most searching and thorough test for tuberculosis is the tuberculin test. The principle of the tuberculin test is that when tuberculin—a secretion of the tubercle bacilli—is put in the body it will search out the tubercle

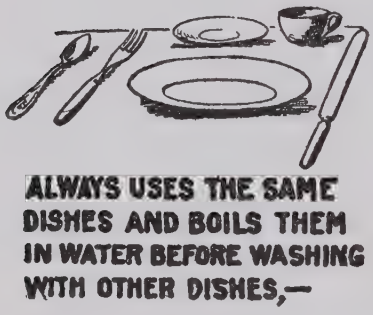

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FIG. 34.—A CAREFUL CONSUMPTIVE.

FIG. 35.—A CAREFUL CONSUMPTIVE.

bacillus and, if any are found, the two of them working together will cause a reaction. The lock fits the key, the key fits the lock, and put together they bring results. Tuberculin applied when there are no tubercle bacilli in the body is without any effect.

Tuberculin is sometimes dropped in the eye, sometimes injected into the skin, sometimes vaccinated into the skin, and sometimes injected under the skin. The latter is the method generally employed, and in my opinion the best method. Its disadvantage is that it gives the person with tuberculosis an uncomfortable day.

There are those who believe it sometimes causes the disease to flare up and spread more rapidly. In a disease whose natural course is alternately to flare up and settle down, it is difficult for anyone to decide the cause of any flareup. Allowing that these men are right in their supposition that the use of tuberculin has sometimes caused the disease to flare up, the fact remains that the enormous good from the early, exact, certain information given is of overshadowing advantage.

The trouble with the tuberculin test is that it is too searching to fit in with other tests. It finds tubercular lesions that are not of much consequence as well as those that are. The proper plan in one of these conditions that suggest tuberculosis is to have a tuberculin test. If there is no reaction, all thought of the disease can be dismissed from one's mind. If there is a reac-

tion, searching physical examination should be made to determine whether the infection is of any clinical importance.

Bacilli in the sputum is an infallible sign, but the trouble about it is that it is a late sign. A man with consumption ought to know of his disease and change his method of living before that sign develops.

HOW TO HAVE CONSUMPTION

Much is to be said in favor of optimism. It buoys one over the rough places. As an antidote to worry and the habit of anticipating ills it is about the best medicine ever taken. It is much better than medicine poured out of a bottle.

On the other hand, optimism has taken the lives of many thousand consumptives. Men cheerily, smilingly saying that all is well, and, acting on this

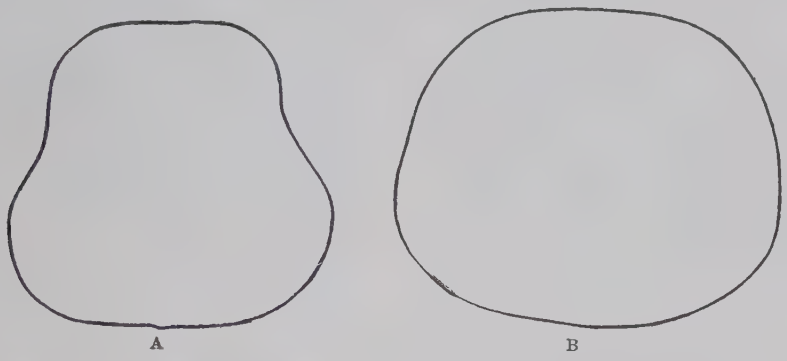

FIG. 36.—A. CHEST IN RICKETS BADLY DEFORMED. B. DEEP NARROW CHEST PRONE TO CONSUMPTION.

assumption, have drifted from good health into early consumption or from early consumption into the incurable stages. Proper effort based on common sense would have kept them on good ground or pulled them out of tight places.

As between a pessimistic consumptive, self-centered and selfish, and one who is optimistic, who bathes himself in sunshine and radiates hope, every man would choose the optimist. But those who have had experience with consumptives know that there is a frame of mind preferable to optimism. *It is the facing of the situation with frankness and intellectual honesty backed by a quiet courage and persisting determination.*

There is no hope for the pessimistic consumptive. There is little for the optimistic. The reward of recovered health does not always come to those of the third group. Nevertheless, they can reasonably expect it. The others cannot.

The first element in the right way to have consumption is the right frame of mind.

Rest is necessary for a cure. A man is a machine daily engaged in eating food and converting it into energy—assets. He does work. Let us call this—

liabilities. Normally he maintains a balance between these. When tuberculosis is added to his liabilities the load becomes too heavy. It is necessary to readjust by increasing food and decreasing labor. Rest is necessary for a cure.

Worry is a form of mental labor. It uses up energy needed to fight the disease and it brings no proper return of any kind. The consumptive must not worry.

And another detail well worth while is that he must not use up energy

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FIG. 37.—TO AVOID CONSUMPTION.

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FIG. 38.—TO AVOID CONSUMPTION.

by needless coughing. A certain amount of coughing is necessary to keep the bronchial tubes clean. Any coughing in excess of this wastes energy and injures the lungs. Needless coughing must be controlled by will power. Medicines should not be used.

A man can fight his consumption in a reasonable or in an unreasonable way. Proceeding with reason and common sense he gives his fighting forces the most favorable ground from which to win.

HOW IS A CONSUMPTIVE TO KNOW?

It is easy to tell late consumption, but then no good comes to the sick person from knowing what his disease is, because cure is beyond his reach. Even the few who are cured have lungs so badly crippled that they have no endurance.

It is difficult to discover early consumption, but so much is gained by early diagnosis that it is all important. *Very early consumption will get well after two to three months of rest, air, and feeding.* Early consumption will get well in six months. A diagnosis that is not made in one of those two stages is not worth much to the patient of average means. The average man can find a way to rest for six months, but any need in excess of that is beyond him. Who should suspect that he is tubercular?

1. Any person who has been in contact, within a year, with a consumptive or a cougher should consider himself under suspicion.

2. Any person who catches one cold on top of another should suspect himself.

3. Any person who has a cough which holds on without cause.

4. Any person who does not feel vigorous, especially those who feel depressed before 8 in the morning and after 3 in the afternoon should take the morning and afternoon temperature. If the morning temperature is under 98 and the afternoon is over 99 he should consider himself under suspicion.

5. Any person losing weight without apparent cause.

Any person belonging to any of these groups should have his condition carefully looked into. This means a careful examination of the chest, a de-

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FIG. 39.—TO AVOID CONSUMPTION.

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FIG. 40.—TO AVOID CONSUMPTION.

tailed inquiry into the history, and such other procedures as may be necessary. A good physician will probably want to watch the patient a while before he makes a diagnosis.

The procedures which are valuable in these early cases are:

1. Careful, painstaking examination of the chest.

2. Careful consideration of the history.

3. The use of tuberculin in the average case, and in the hands of the average physician is the most valuable of all. It is most reliable in the early cases which offer so much hope.

4. Examination of the sputum by the microscope, a procedure of great service in the late cases but which does not help much in the early ones. It is desirable to have the diagnosis established before tubercle bacilli appear in the sputum. The cases which have fever, sweats, coughing, and spitting are late cases and easily diagnosed.

To know, and to know early, is an absolute necessity if the consumptive is to get well. For knowing early there are two requisites: First, to become suspicious just as soon as there is reasonable ground for it; a sense of mental security not based on physical facts is a delusion which inevitably leads into situations from which there are no escapes. Second, a careful, comprehensive examination.

HOW CAN A CONSUMPTIVE JUDGE OF PROGRESS?

The signposts are temperature, pulse, weight, cough, and expectoration. The morning temperature is generally below 98, the afternoon temperature is above 99. When the temperature stays below 99 things are usually going nicely. When it goes over 100 the poisoning is getting beyond the system's carrying capacity and the patient's work must be lessened, his food and air increased.

After a certain fashion the pulse indicates the progress of tuberculosis. The number of beats will mount up rather faster than does temperature. A patient who has fever and a rapid pulse can bring his temperature to normal much more easily than he can cause his pulse to slow up. A fast pulse will persist for weeks after temperature has become normal.

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FIG. 41.—TO AVOID CONSUMPTION.

When a person who is eating well and not worrying loses weight consumption is to be thought of, particularly if there is a cough which hangs on. In the early stages of consumption if work is lessened and food increased properly the patient always gains in weight. If he is of the lean kind he will gain more slowly; if he is a good feeder he will gain more rapidly. The uniformity with which early stage consumptives gain flesh when properly fed is proof that any healthy person can get fat if he wants to. Of course thinking he wants to does not get him anywhere.

When a consumptive gets to the point where he will not fatten even though he rests and feeds he is not doing well. In some cases the patient fattens even though his disease is progressing. In other cases the patients gain fat faster than their lungs improve. Nevertheless fattening and wasting are signs which indicate how the battle is going.

Cough and expectoration are signs of value. Consumptives soon learn to cough little. A visitor to a consumptive hospital does not hear one-tenth the coughing that he does in a theater. The amount of expectoration is a more valuable sign than the cough. In measuring the sputum an average must be struck. A temporary nose cold or a temporary ordinary bronchitis will temporarily increase the amount of sputum.

Sweats, pallor, emaciation, diarrhea, indigestion mean that the fight is running strongly against the patient.

Signs which the patient can notice in his chest are not of much service in determining how his disease is progressing. He should tell his physician of such sounds, pains, and unnatural feelings as he has observed, in order that the physician may interpret them. The results of physical examination of

the lungs by the physician are not of the value in indicating progress of the disease that people generally believe.

And, finally, conclusions must not be drawn from observations of but a few days. Consumption is a disease which goes by "fits and starts." Each case calls for careful, close study. Each case needs to lean on a master mind.

WHAT THE CONSUMPTIVE SHOULD DO

It is most important that he should eat enough food. It should be of the proper kinds. A standard day's ration should consist of:

Meat	6 ounces
Milk	4 pints
Eggs	2
Cereal	1 plateful
Bread	8 ounces
Butter	2 ounces
Potatoes	4 ounces
Pudding	1 helping
Apples or oranges	2
Lemon, or juice of	1

Spinach, cauliflower, lentils, peas, and beans may take the place of potatoes. Nuts may take the place of some of the butter. Honey and sugar may be taken freely, providing these articles do not disturb the digestion.

Some people can profitably increase the above quantities about 50 per cent. A few people can double them. Some will do better if they decrease them 20 per cent.

The winter diet should have more fats than that of summer. There should be four meals a day. The food should be eaten slowly and be well chewed. The mouth and teeth should be cleaned before and after eating.

He should sleep at least nine hours of the twenty-four. He should sleep on a sleeping porch properly protected against rain and snow. If he sleeps in a room the temperature must not go higher than 45°. The window must be wide open, for it is more difficult to get air into a cold room than into a warm one.

In order to keep warm he must have a paper blanket between the mattresses and another between the quilts which cover him. He must have a woolen nightcap, woolen mitts, a long woolen bathrobe, and slippers made of soft sheepskin tanned with the wool on them.

Under no circumstances must he work over six hours a day. A fair number of cases can work four hours a day, many can work two hours, many must sit out in the sunshine and air all day without working. No whisky or other stimulants should be used. No cough medicine nor any other medicine should be taken except as a physician directs.

No case should be without medical direction. The proper way, in consumption, is to have a physician call at stated intervals, study the history, and direct the method of living. A detailed history of the case and the household happenings should be kept by a trained nurse or by a member of the

family. When a case is being cared for by the family, a nurse should call in at intervals.

In Chicago it is estimated that there are 15,000 people with tuberculosis. In 10,000 of them the disease has progressed far enough so that they know they are tubercular. Less than 1,000 are in hospitals and sanitariums.

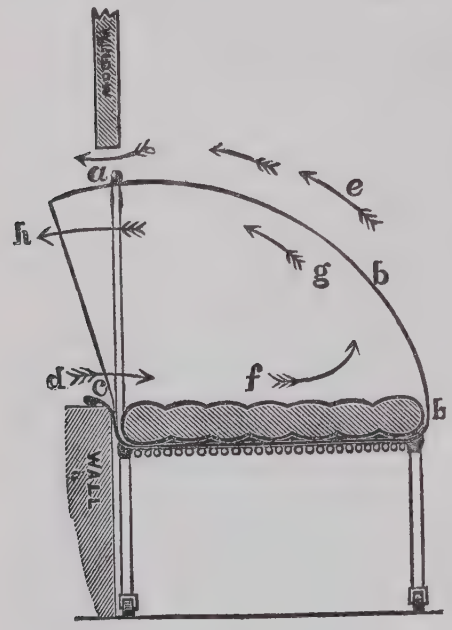


Fig. 42.—Cut of Window Tent Showing Ventilation.

There are 9,000 people in this community who have a close personal interest in knowing what to do at home. From these 9,000 about 5,000 persons contract the disease each year. They, too, are interested. This makes a total of 14,000 persons who have a direct personal interest in knowing what a consumptive should do in the way of eating, sleeping, and resting. These are about one one-hundred-and-sixtieth of the total population.

Sanitariums and hospitals do magnificent work, but the great majority of consumptives are cared for in homes, are nursed in the main by members of their families, and cared for by family physicians.

There is a general agreement that the treatment of a consumptive must not stop with the arrest of the disease. The patient must be got back into social and industrial life. Cabot tells us that men live by work in more senses than one; that a sanitarium that does not lead back into life is a blind pocket; its statistics of cures do not stand when the cases are looked up ten years after they have left the institution. The report of the social service department of Indiana university says:

"Once interest a patient in his own condition and problem and give him hope, and he will go further than anyone else, according to his ability, toward solving that problem."

CHASING THE CURE IN THE CLOUDS

In the cure of consumption, climate counts for 15 per cent. If we take two men with the same degree of infection, having about the same capacity for resisting the disease, having about the same amount of money to provide rest and open air treatment, submitting themselves to the same degree of control, the man who is in Colorado will stand a 15 per cent better chance than the man in Illinois.

If the one goes to Colorado without money and takes his chances in the

catch as catch can of what is called ranching it, he will lose more than 15 *per cent of his chance, and therefore Colorado will net a loss for him.*

As so many of the people who chase the cure in the West plunge foolishly into the venture it is probable that the real value of climate is under 15 per cent rather than over 15 per cent.

How does climate work the cure? Probably some part of it is due to sunny days, low air humidity, dry soil, and slow winds. Each of these agencies

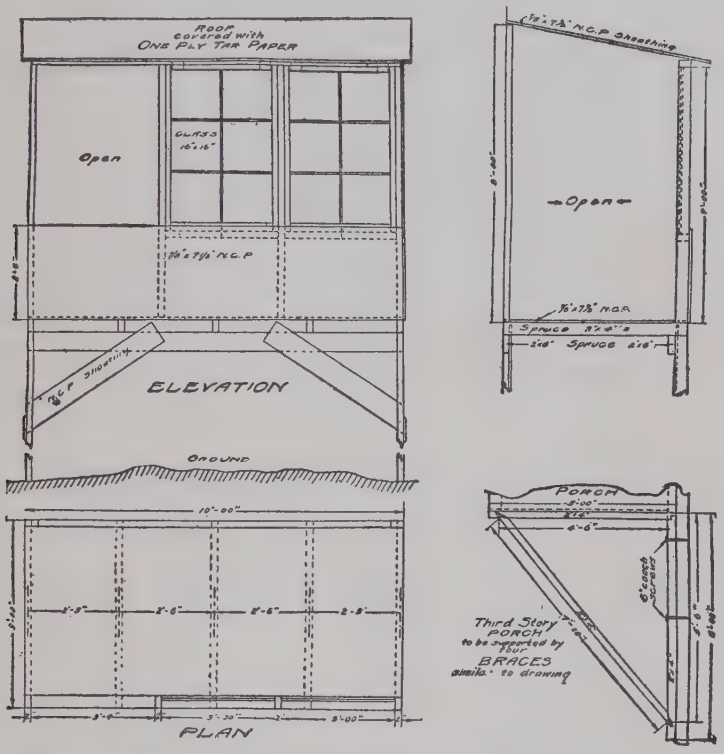


Fig. 43.—Building Plan for Sleeping Porch.

of good have been written about until everybody knows of them. Recently scientists have been trying to discover whether altitude of itself is of advantage, and if so, how.

In 1911 some scientists from Oxford, England, and one from Yale conducted some studies on mountain sickness on Pike's Peak. Incidentally they discovered that at high altitudes the blood is richer than at sea level, and that a certain blood cell called the lymphocyte is increased in numbers.

Before Metchnikoff began to study men he was known as a great zoölogist. He was especially learned in the ways of animalculae, the microscopic animals which the boil-the-water film at the moving-picture shows as crossing the curtain and eating up everything within reach.

When Metchnikoff took up the study of men he found in his blood small cells called leukocytes. Most of these leukocytes are called polynuclears, be-

cause they have several nuclei. These polynuclear leukocytes move around like the animalculae at the picture show and eat up all the germs in reach.

Among these active, rustling, hungry polynuclears are certain quiet leukocytes with but a single nucleus. These were called lymphocytes.

The tubercle bacillus is an armored knight, as truly armored as the knights of the middle ages. Its armor is wax. But wax to a polynuclear leukocyte is as impenetrable as iron.

Therefore, although in pneumonia, appendicitis, and many other kinds of infection the white cells jump from the normal 5,000 to 20,000 or more, and the polynuclears jump from the normal, 60 per cent about, to 80 per cent about, in consumption there is no considerable increase in the number of leukocytes, and the polynuclears actually decrease in percentage.

However, it has been found that the quieter mononuclear leukocytes called lymphocytes can eat the wax out of the consumptive germ, and then proceed to kill it. The investigators above referred to found that at high altitudes the percentage of lymphocytes was increased.

Bunting at Madison, Wisconsin, found that the sturdy students of Wisconsin university had 42 per cent of lymphocytes among their leukocytes. Harvard students had 37, and Colorado college 52. Webb at Colorado Springs found that children had 60 per cent and adults 14.

The visiting scientists found that each cubic centimeter of blood normally had 2,200 lymphocytes, and that on Pike's peak this rose rapidly to 4,100, and then settled back to 3,300, where it remained.

In plainer words, altitude increases the number of those blood cells which are the best fighters of the consumption germ we have—an additional factor in that 15 *per cent.*

CURE OF TUBERCULOSIS

Our present cure of tuberculosis is a four-legged stool. One leg is rest, the second control, the third food, and the fourth fresh air.

The object of rest is that all of the energies of the body may be available for combat with the disease.

The need of control rests on many factors. The fight is to be trying. Backbone will be required. Nobody gets well except the fighting men. Optimism is needed—optimism savored with sanity. Quiet courage is needed. Persistent, dogged determination is a requisite. Rarely does any man alone and of himself measure up to these demands. The control must help to make backbone. And then the waters are beset with rocks and skilled piloting is required.

The need of an excess of food is that resistance may be heightened. In addition, tuberculosis bears a peculiar relation to nutrition. The neglected consumptive falls off out of all proportion to the disturbance of his digestion.

Fat people have always had a partial immunity towards it. Since the start of things man has somehow sensed the idea that oils and fats were helpful in curing the disease. In addition to the general increase of resistance from full eating consumption seems peculiarly responsive to a good food intake.

The need of air comes from the gain of breathing pure air as compared with the breathing of foul air. We would expect neither a sick nor a well

man to thrive on sewage as a drink. Neither can we expect men to thrive on sewer air, even though they have been trying to get accustomed to it for a long time. A further gain comes from the power of fresh cold air to absorb heat from the body.

When all this volume of food is being burned into energy and resistance an excess of heat is made. It must waste. If there is plenty of cold air in contact with the body it can be wasted to the air. If the air of the room is warm the chance to waste surplus heat disappears, the excess of food cannot be taken and resistance cannot be built up.

Such are our only elements of cure. The whole makes up the only cure. The advertised cures—the patent medicines—are the rankest fakes and frauds. The wrappers and testimonials in the old days were tissues of falsehoods. The Shirley Law, passed on August 20, 1912, may force them to quit lying. Many of them depend upon opium and alcohol for the only effects which the patient could feel. They were, therefore, not only dopes but they were habit-breeding dopes. They were robbers, for they took the money of poor unfortunates on pretext of doing for them what they could not possibly do.

One of the arguments in favor of the national insurance plan in operation in some parts of Europe is that it pulls the teeth of these fakes. The source of much of the abuse of Wiley and of the American Medical Association is that, in protecting the people by exposing these frauds, they have put a crimp in the gains of certain people.

WHERE SHALL THE CONSUMPTIVE GO?

So far as the average consumptive is concerned, he will have to stay at home. There is no other place for him. Ten years ago, someone, Osler, I think, said that 98 per cent of the consumptives must stay at home. Change of climate was available for only 2 per cent. The situation has improved in the last few years.

Nearly every fraternal order now has a well regulated, well run sanatorium. One old line life insurance company, the Metropolitan, is building a consumption sanatorium, and before long the old line companies will follow the lead of the fraternals. Many of the trades are now doing relief work for their tuberculous members, and some part of the relief consists in organized machinery for caring for their consumptives who are chasing the cure. The printers have their own home and, I dare say, other trades also have equipped homes. The Y. M. C. A. has its tuberculosis camp at Denver and the Jews have their hospitals.

An organization of medical men in the West has expressed violent objection to having that section made a dumping ground for consumptives without strength to work and without resources to sustain them without work. The Rocky Mountain Public Health Association recently estimated that 11,000 of the 12,775 consumptives in Colorado were citizens of other states. Therefore, 133-134ths of the financial burden on Colorado for consumption is properly chargeable to other states. *From the standpoint of the individual, it is the height of folly for a consumptive to go away from home unless he has resources enough to carry him without work in his new home.*

In changing climate the individual must be studied from every standpoint. People from northern Europe and the northern United States, according to Knopf, do best in Colorado. The people who come from the sunny parts of America and Europe do best in New Mexico, Arizona, California, and North Carolina. Observers have noticed that Europeans generally do best when they go back home—e. g., the Irish to Ireland. Bone tuberculosis, gland tuberculosis, and tuberculosis in children generally do best at or near the sea shore. Lung tuberculosis does best in the mountains. Moist tuberculosis—

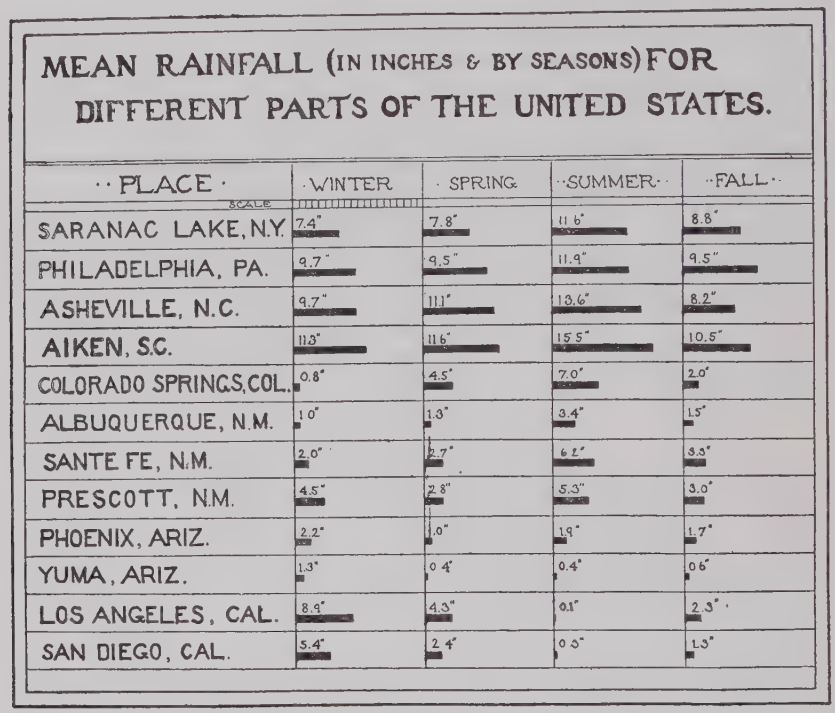

MEAN RAINFALL (IN INCHES & BY SEASONS) FOR DIFFERENT PARTS OF THE UNITED STATES.
PLACE
WINTER
SPRING
SUMMER
FALL
SCALE
SARANAC LAKE, N.Y. 7.4" 7.8" 11.6" 8.8"
PHILADELPHIA, PA. 9.7" 9.5" 11.9" 9.5"
ASHEVILLE, N.C. 9.7" 11.1" 13.6" 8.2"
AIKEN, S.C. 11.3" 11.6" 15.5" 10.5"
COLORADO SPRINGS, COL. 0.8" 4.5" 7.0" 2.0"
ALBUQUERQUE, N.M. 1.0" 1.3" 3.4" 1.5"
SANTE FE, N.M. 2.0" 2.7" 6.2" 3.3"
PRESCOTT, N.M. 4.5" 2.8" 5.3" 3.0"
PHOENIX, ARIZ. 2.2" 1.0" 1.9" 1.7"
YUMA, ARIZ. 1.3" 0.4" 0.4" 0.6"
LOS ANGELES, CAL. 8.9" 4.3" 0.1" 2.3"
SAN DIEGO, CAL. 5.4" 2.4" 0.5" 1.3"

Fig. 44.

tuberculosis with sputum—does best in a dry climate, one, however, where there is not too much wind and dust.

If a patient is sanguine, cheerful, and bright he will stand a change of climate well. If he is morose and hypochondriacal or given to homesickness, he will not stand going away well. Generally, patients with heart trouble or great nervous tension or tendency to hemorrhage do not stand elevations well. Less than 7,000 feet does not seem to make any difference.

CLIMATE AND CONSUMPTION

The climate of Colorado, western Texas, New Mexico, and Arizona is without equal for tuberculosis. The weather reports for the last twenty years show that San Antonio has a yearly average of 99 cloudy days; El Paso, 36,

and New Mexican points about the same number. The daily mean humidity at San Antonio is 67.5; that at El Paso, 40, and that at some points in New Mexico and Arizona lower still. The average rainfall at San Antonio is twenty-six inches; at El Paso, nine inches, and at Albuquerque, eight inches.

However, the trouble about the matter is that the average man does not know what climate can and what it cannot do for a consumptive. More than half the consumptives who travel to these resort regions would have been better off, more comfortable, more contented, and would have had a better chance to live had they stayed at home.

Dr. Sweet of the Public Health Service estimates that there are 30,000 consumptives in western Texas alone and that there are 27,000 in New Mexico. Many of these are entirely well. Many are on the road to recovery. But, unfortunately, a large number are there without funds or income wandering around from place to place.

Ten years ago more than 50 per cent of the consumptives dying in El Paso, Texas, had been in the region less than six months, and 20 per cent had been there less than a month. In 1913 the figures were 22 per cent and 8 per cent respectively. In Albuquerque, New Mexico, in 1913 the figures were still 42 per cent and 13 per cent respectively.

In El Paso the length of residence there of the 2,791 consumptives who had died there during ten years was divided as follows: Under thirty days, 11.5 per cent; thirty days to six months, 19 per cent; six to twelve months, 8.3 per cent; one to two years, 7.9 per cent; two to five years, 12 per cent; five to ten years, 5.6 per cent. The percentages for Albuquerque were similar.

Of 1,775 bodies of consumptives shipped out of western Texas, 225 went to Illinois; 217, to Missouri; 131, to Ohio, 32 per cent of the whole. Add to these the numbers from Kentucky, New York, Tennessee, and Mississippi and we get more than 900—over 50 per cent of the whole.

The normal consumption death rate of a well regulated community is around 140 per 100,000. The mean death rate of Albuquerque from consumption for ten years past has been 1,404.6—about ten times the normal; that of El Paso, 788.7; Asheville, North Carolina, 672.9; Colorado Springs, 607.6; San Antonio, 449; Denver, 372; San Diego, 324, and Los Angeles, 299.8.

The reason for these high rates is because each year Albuquerque receives something over 2,000 consumptives from outside its state; El Paso, nearly 3,000, and San Antonio, 3,500. But 7.8 per cent of the consumptives dying in Albuquerque were born in New Mexico. But 12.1 per cent of the consumptives dying in El Paso were born in Texas.

Furthermore, a very large proportion of those traveling about in trains in the health resort region are in the last stages of the disease, and a fair proportion of those on the through trains entering the resort region are very far advanced cases.

The lessons are two. First, very advanced cases should stay at home. The chance of cure is very slight. The chance of accidents on the road is not to be overlooked. The sick must see that going away is bad judgment.

The second lesson is that the climate cannot cure unless it has a fair chance. Wandering around from place to place does not help. Restlessness is a serious handicap. The best chance lies in settling down in one place, getting into the hands of well-equipped physicians and nurses and obeying orders.

CARE OF CONSUMPTIVES

Custodial care of consumptives is better than no care at all; curative care is, of course, better; and best of all is prevention. So much for the standpoint of the sick person. From the standpoint of the community, custodial care is best.

Consumption is generally contracted through continuous, close, personal contact. Air infection and milk infection are of consequence, but continuous contact infection leads all the rest. It is in the home that the conditions of close, continuous, personal contact are most frequently found. Therefore the most important consideration is to get consumptives from their families into the hospitals, where they will have custodial care.

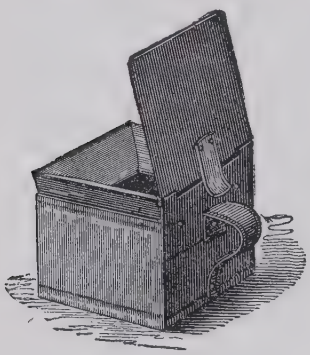


Fig. 45.—Sputum Cup.

A French physician has recently investigated 500 consumptives, with a view of discovering whether susceptibility to the disease is inherited. The conclusion at which he arrived is that a case in the family increases the tendency to the disease to at least the second generation.

Communities should have hospitals for late cases. Many of them have seen this need; many of them have not acted on this need because, somehow or other, such hospitals are usually filled up with tramps, hobos, homeless men, casual workers, aliens, and such people. The family man or woman, the home man, the steady worker, the people who made up the steady, day in and day out citizenship, would not go to such hospitals. The home, the family, and the factory took care of the citizen until pretty near the end. In the meanwhile he was endangering his children and his benchmates. In the light of what the Frenchman quoted above tells us, it is, above all, necessary to protect the parents. The homeless men and women are rarely parents.

The remedy? To provide care in the hospital for late cases so humane and comfortable that the man with a home will voluntarily go there and stay there. To equip consumption hospitals as well as general hospitals are equipped with nurses, physicians, instruments, and laboratories. To provide open air treatment for suitable cases. To furnish good food and enough of heat for comfort. To locate them in the city and reachable within one hour and by a 5-cent fare from the homes that they draw from. In a word, to draw patients from their homes because they are more comfortable, happier, and more hopeful in the hospital than elsewhere. By persuasion rather than by compulsion will the family be protected against its dangerous members.

NIGHT CAMPS FOR CONSUMPTIVES

An interesting report on the work of the New York Night Camp has been made to the New York State Medical Society.

A night camp is a place where a consumptive, still able to work, can get his dinner, his lodging, and his breakfast. The food furnished is even better and more abundant than that of a consumptive sanitarium. He sleeps out of doors on a sleeping porch or in a room where out-of-doors conditions prevail. In a word, a right-at-home sanitarium.

The people who need night camps are early stage consumptives who must keep at work, who cannot go away, and who cannot get proper food, sleeping arrangements, ventilation, or nursing in their homes. As they are working during the day, they cannot make use of a night camp unless it is conveniently located.

The night camp idea has been tried before. It must have been eight years ago that Miss Addams tried to interest someone to give about $2,000 to inaugurate such a camp to be maintained particularly for working women living in the neighborhood of Hull House. She did not succeed. Perhaps the time was not ripe. Our minds were then running on sanitariums located off somewhere. At any rate, Chicago lost its chance to be early in the field.

TUBERCULOSIS DAY

The custom of setting aside certain days as saints' days is older than our country and much broader. On such days everybody who can, stops work and gives over the day to the customary observance. The money cost of these days is enormous, and yet willingly we pay the cost.

Tuberculosis day is a new sort of a day. On the other days we do honor to the memory of some dead and gone servant of the common good. Tuberculosis day is the season when we pledge ourselves anew to a growing movement —the movement to end consumption.

Consumption is decreasing—that much is certain. The figures show the disease to be on the decrease. It is plain, though there is no way to show, that the decrease is in those parts of the country where the interest in the fight is most general. Furthermore, the decrease is in proportion to the interest. In those places where the people think they have no consumption problem and where they are not joining in the crusade, the disease is on the increase.

Consumption slipped up on us while we were not watching. While we were busy with the work of everyday life it was quietly eating away like a moth in a chest. The remedy is to get busy. It is not the custom for 90,000,000 people to get busy in a hurry. We must first talk about it.

The first year you talk about it a few see the point and get busy. The crusade is begun. The next Tuberculosis Day starts a few more. After a while the employers of labor see where they are putting the moth in the chest, and they get busy.

The next year the woman who keeps the windows nailed down and the children sewed up from fall until spring sees where she has put the moth in the chest and gets busy. Maybe the next year it's the taxpayer who sees that caring for consumptives is the cheapest way, and he gets busy. Maybe next year it's the spitter, and he gets busy by being careful.

The consumption fight is being won. The number of deaths from the disease in the active centers of the fight is less than the number ten years ago.

It takes three years for results to show. Our only way of judging is by vital statistics. The disease lasts nearly three years. Therefore, judge your 1914 and 1915 activities by your 1916 consumption death rate.

The fight is being won. Tuberculosis Day is helping to win it. A day that is contributed to giving battle is worth while. No feast day, national birthday, or great battle anniversary celebration is better worth while.

CAPTAIN RAOUL'S EXAMPLE

For many years Captain W. G. Raoul was president of a railroad in Mexico. When the railroads of the republic were taken over by a new combination Captain Raoul returned to his old home in Georgia.

The captain found himself in a position in which many most capable men have found themselves, and many others will find themselves. He was too old for the aggressive work of managing a great corporation. The competitive basis of that work did not fit this man, well on toward the evening of life.

He might have returned to the home of his early years and led a life of ease, but he preferred to take another course. He had a few more fights in him.

The fight against consumption was to his liking. He was no longer a two minute horse, but the tuberculosis fight is in the three minute class, and he felt able to hold his own in that class. He became an officer in the tuberculosis organization and fought for a sanitarium. The sanitarium secured, he became one of its officers. Instead of rusting out he worked to overcome consumption until he died.

I do not know why he became interested. He may have had some personal interest in consumption, or his interest may have been on the grounds of general welfare. Whatever was the cause the example was of the best.

Why will not that group of men who are too much worn out for the hard strife of the severest competition give to great philanthropic and economic enterprises out of the abundance of their trained judgment and executive ability?

When Captain Raoul's will was read it was found that he had left $50,000 for anti-tuberculosis work in Georgia. The first expenditure of the income from this bequest has been used for a state tuberculosis survey.

It is usually difficult for legislatures to decide what to do because of lack of information. The idea prevails rather generally that consumption is a disease of cities only. Many people think because not everybody has consumption that nobody has it.

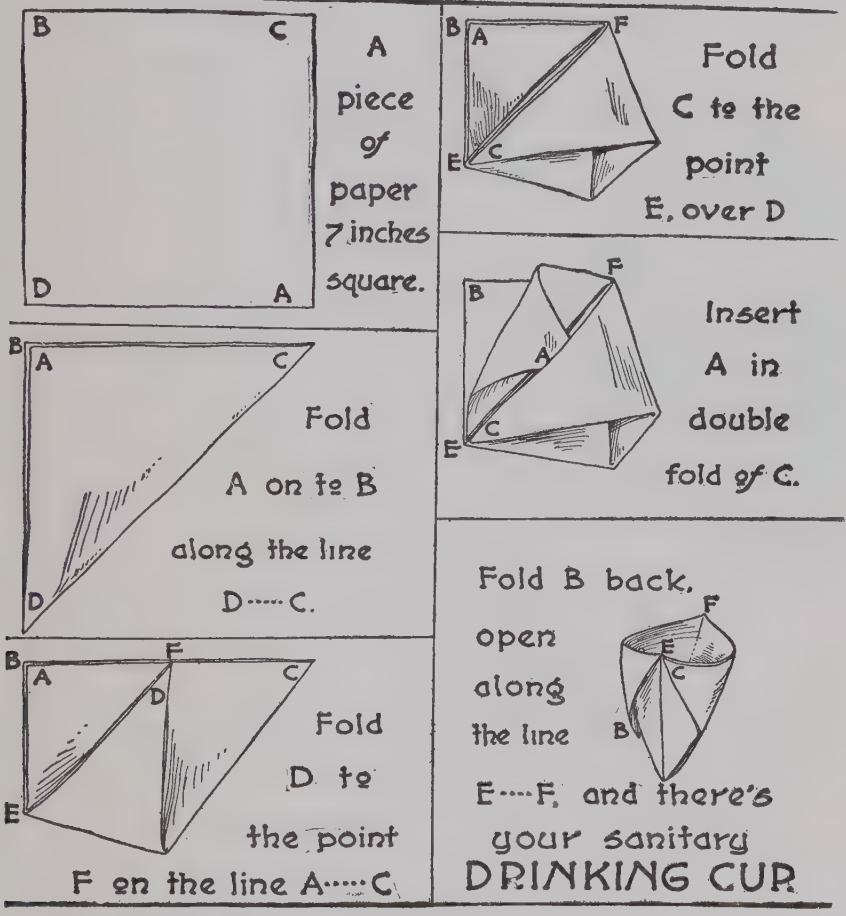
When we say that the consumption death rate is 170 for each 100,000 people it does not mean anything to a man who lives in a sparsely settled country and never saw two hundred people assembled.

Tuberculosis surveys are just as necessary for community life as taking stock is for a merchant. The Illinois Federation of Women's Clubs has completed a tuberculosis survey of Illinois. Wisconsin has been making surveys through its State Tuberculosis Society for several years. Most states are in the dark as to tuberculosis conditions among their people. Perhaps here, too, Captain Raoul's excellent example will be followed.

THE CONSUMPTIVE NURSE

Is it safe to have a tuberculous nurse care for your baby? Is it safe to have your baby cared for by a nurse that you do not know to be free from contagion?

One year a New York infant asylum employed a nurse in May. She had



Chicago State Board of Health.

FIG. 46.—TO FOLD A PAPER DRINKING CUP.

been in a tuberculosis sanitarium during the previous winter, but the asylum authorities did not know it.

In June they noticed that the nurse was sick with a cold. About July first they found that she had tuberculosis, whereupon they removed her.

She had cared for ten children for six weeks. During this time many of these children had had some digestive trouble, and, in consequence, the nurse had given extra attention to the bottles and nipples.

In this asylum all the children are fed on pasteurized milk. These chil-

dren came in contact with no outside people. It was possible to eliminate every source of infection except the nurse.

Now, what were the results of these exposures?

In April all of the children were tested for tuberculosis by the skin tuberculin test. Three reacted. In July they were all tested again. The same three reacted; the others did not.

In October they were tested again and all reacted. In January of this year all of them reacted. The nurse had infected the seven previously uninfected children.

In the meanwhile the other children in the asylum did not develop tuberculosis. Those that showed reaction when they first came continued to show it, but no new cases reacted. None developed the disease except the babies cared for by this nurse. None of the children was extremely sick. Apparently each of them will completely encapsulate his tubercular focus, and these foci may break out in later life, or they may be permanently walled off.

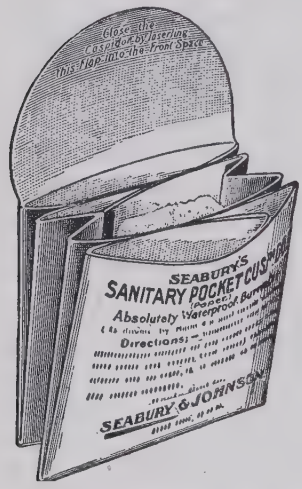


FIG. 47. — POCKET SPUTUM CUP.

Had this nurse cared for these babies for six months instead of six weeks, the story might have been different. The dose of tubercle bacilli might have been so large as to have caused an acute, progressive infection instead of the walled off patches, such as they clearly have.

This thing of resisting the disease does not seem to mean that we can prevent it from getting a foothold. Every one of the exposed babies was infected. What it means is that the resistant person will be able to wall it off with a fair chance that it will stay walled off.

Of course, it is unfortunate that this experience occurred, but if it will make mothers more careful of the health of the nurses to whom they intrust their babies it will do more than enough good to compensate.

Tuberculosis.—*T. H. G. writes: "1. Why is it that tuberculosis so often follows typhoid fever? 2. Isn't it a fact that more people are attacked with tuberculosis between the ages of 25 and 30 than at any other period? 3. Why is it that the tubercle bacilli hover so conveniently and successfully near people of that age? 4. Why is it that in proportion to the population there is as much tuberculosis in the country as in the city?"*

REPLY.—1. It does not. Nearly always, when consumption is supposed to follow typhoid, the case was consumption from the start. There are a few exceptions. Consumption after typhoid is rare.

2. Yes.

3. The health between 20 and 30 averages the very best. There is almost no death rate from any disease except consumption in those years. Susceptibility to disease in general in those years is at its lowest.

4. The city consumption rate is higher than that in the country because of more consumption contagion, poorer houses, and poorer hygiene. The

city rate is falling and the country rate is not. Before many years, the statement on which you base your fourth question may be true.

Tuberculosis of the Spine.—*G. D. F. writes: "Please tell me the symptoms of tuberculosis of the spine and how it affects the patient. Also the cause and how it should be treated."*

REPLY.—The most prominent symptom is pain. The pain being due to the pressure on the nerves, it may be felt some distance away, down the leg, where it may be called sciatica, or in the abdomen, for instance. The muscles near the affected bones are held rigid. As jarring increases the pain, the muscles try to protect the sore bone. Later the spine twists. It may show a knuckle over the affected vertebra. There may be fever. X-ray shows the diseased bone, the deformity, and the abscess, when there is one. A keen diagnostician catches the disease before there is much deformity. A careless one treats the disease as rheumatism or sciatica for a long time. The cause is infection with the tubercle bacillus—frequently through milk. The treatment is rest in bed for a while; then proper braces, tonics, forced feeding, out-of-door life, tuberculin.

Curvature of the Spine.—*I. M. writes: "I have a daughter 15½ years old, whose spine has become crooked in the last two years, the right side bulging out under the arm, and the reverse on the left side. I have been sending her to a gymnasium, but without result, and it is becoming worse. A year ago she weighed 104 pounds and now but ninety-five pounds, and I fear she is becoming tubercular. Where in Chicago could I get a free, reliable diagnosis of her case, as our financial circumstances prohibit a specialist?*

"Do you consider the wearing of appliances beneficial for crooked spines, or will it cramp other organs so as to do more harm than good?"

REPLY.—Your child has been tuberculous for more than two years. The disease was breaking down some part of a bone in her spinal column before her back began to bend. She probably got it from tuberculous milk which she drank about three years ago. She probably will have to go to bed for a while and then she can put on proper appliances. These appliances will straighten out some of the curve and in that way lessen the "cramping of the other organs." A crooked back cramps organs. Go to any orthopedic clinic. Find out what days the clinic is running and then bring her in. They will find a place in a hospital for her.

Curvature of Spine Causes.—*G. A. writes: "I am a man 25 years of age. Kindly advise me of the cause of curvature of the spine. I have never been able to find out the cause of the deformity."*

REPLY.—There are several causes.

1. A frequent cause is tuberculosis of one or more bones of the spine. The bacilli are taken in with the food—usually milk.

2. Old infections outside the bones of the spine, but producing heavy scar tissue which pulls the spine out of line; for instance, an old pleurisy.

3. Habits, position of body while at work or at the school desk.

4. Infection of the joints between the bones of the spine; for example, rheumatoid arthritis.

Curvature of the Spine.—*A. J. writes: "I am a woman about 28 years old. I have curvature of the spine, caused by a fall when I was 6 years old, but have never been sick a day from it. 1. Won't it be wrong for me to*

marry? 2. Would my children necessarily have curvature? 3. Is there danger of me getting tuberculosis?"

Reply.—1. That is a matter for you and your affianced to decide. A physician can tell you whether your curvature would prevent you from bearing living children.

2. No. Practically, they would be as liable to tuberculosis of the spine (the cause of curvature) as other children and no more so.

3. You are about in the same average danger as women of 28. Intrinsically your danger is a little above the average but, being apprehensive, you lead an above-the-average hygienic life.

Ill Not Transmissible.—*Constant Reader writes: "I am a young man not 27 years old. I think a great deal of a young woman of 20, but she has a curvature of the spine, so that one shoulder is quite prominent and her chest also somewhat out of position. Will it be safe for me to marry her? Would our children be normal?"*

Reply.—If the deformity is considerable it is probably due to tuberculosis, caused by drinking milk from tuberculous cows. If so, it is not transmissible; her children will not inherit it.

If the deformity is slight it may be due to sitting habitually in a cramped position. If so, it is not transmissible; her children will not inherit it.

If the curvature is limited to the region of the chest it will not interfere with child bearing. Frequently, however, a curve high up is accompanied by a countercurve lower down. Would the young woman be willing to have her physician pass on these points?

Consumption in Diabetes.—*C. O. A. writes: "I have read quite a number of your articles on the subject of tuberculosis. The only thing ever mentioned as incurable is the third stage. Nothing is ever said as regards tuberculosis following diabetes and the hopelessness of such a case, or the following of tuberculosis after any other serious illness and what might be done. It is true people who have only tuberculosis, if action be taken early, can be helped a great deal and perhaps cured. But what of the patient who has diabetes or one who has had pneumonia, and tuberculosis begins to set in? What care should he have? Why not have this information published as well as the other? What is to be said of the patient who has fistulas?"*

Reply.—I am sorry that you have not found what you want in the articles. As I understand it, you seek answers to three questions:

1. What is the outlook when a diabetic contracts consumption? A.—It is exceedingly bad.

2. What is the outlook of the man who has pneumonia and later develops consumption, and what should be done for him? A.—If his supposed case of pneumonia be pneumonia, he has the same chance as a man who develops consumption in the ordinary way. Many cases of pneumonia that "run into consumption" are really cases of acute or galloping consumption from the start. The outlook for these cases is poor. They must go to bed, preferably in an institution, and take even stricter rest, open air, and feeding than the other consumptives.

3. The consumptive who has fistula is practically in about the same position as other consumptives. His fistula should be cared for. It adds a little to the gravity of his case.

Tuberculosis in Animals.—*J. K. H. writes: "You said recently that tuberculosis in the lower animals—cows, pigs, etc.—resembles that disease in man. The treatment prescribed for tuberculosis is in the main fresh air. Now, why do animals have this disease, when they live out of doors all the time?"*

Reply.—Cows that are on the range do not have tuberculosis to any appreciable extent. They have it in proportion as they are housed. Pigs have tuberculosis contracted through food. Most of their tuberculosis comes from drinking tubercular milk or eating tubercular germs from cows.

Symptoms of Consumption.—*A. F. writes: "Will you please tell me what are the symptoms of consumption?"*

Reply.

A. Very early:
   1. Low temperature in the morning.
   2. Slight fever in the afternoon.
   3. Loss of weight.
   4. Slight cough, persisting.
   5. History of exposure to person with consumption.
   6. Reaction to tuberculin.

B. Early:
   1. Low temperature in the morning.
   2. Fever in the afternoon.
   3. Loss of weight.
   4. Persisting cough and sputum.
   5. Sometimes tubercle bacilli in sputum.
   6. Signs on physical examination.
   7. Reaction to tuberculin.

C. Later:
   1. Fever.
   2. Cough.
   3. Sputum containing bacilli.
   4. Physical signs.
   5. Loss in weight.

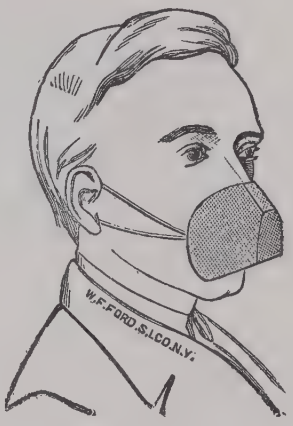


Fig. 48.—Respirator.

Diagnosis should always be made before bacilli appear in the sputum. Late diagnosis makes cure impossible for any except the better-to-do.

Consumption and Cough.—*J. P. S. writes: "Is it possible for one to have consumption without a cough. What is the difference between tuberculosis and consumption, or is there none?"*

Reply.—When the tubercle bacillus locates in the body it sets up a disease called tuberculosis. If it has located in the lungs the disease is called lung tuberculosis or pulmonary tuberculosis, or by the shorter term, consumption.

When the tubercle bacillus locates in the lung small tumors begin to grow. When these nodules are small there is no cough. When they have grown large enough to press on the bronchial tubes cough starts. At first the cough is a slight hack. Nothing is coughed up. After a few days coughing raises a little. Some weeks or perhaps some months later it raises sputum containing bacilli.

You see it is possible to have consumption a short while before the cough starts, but only for a short while.

Not Tuberculous Cough.—*F. W. writes: "I have had a sort of chronic cough for the last year. I went to a prominent doctor and he told me as soon as the hot weather would arrive I should get rid of it by perspiring. I am perfectly well, weigh 215 pounds, and am gaining all the time. I sleep well, eat well—in fact, feel better now than I ever did before. Please advise me."*

Reply.—There are many causes for coughs. Tubercle infection is one. If you are gaining in weight, are feeling well, and your physician cannot find tuberculosis, put that cause out of your mind.

Looks Like Tuberculosis.—*E. R. S. writes: "Last spring I had my tonsils removed. I caught a heavy cold and doctored it myself. Now I cough slightly. The lymph glands were much swollen, but are ordinary now. But I have a swelling of the thyroid gland. My temperature rises in the afternoon. I lose my voice also. My doctor says there is no consumption. I have leukorrhea. Do you think that weakness causes other faults?"*

Reply.—An afternoon fever, a slight cough, and some disposition to loss of voice suggests tuberculosis. Have at least one more examination for tuberculosis.

The physician examining will advise you about your thyroid. Not much can be done to prevent the thyroid from swelling.

Leukorrhea is not a source of weakness, nor does it result from weakness. It is the result of a local infection with any one of several bacteria. This infection usually is innocently acquired. It must be treated locally or by vaccines. Keep this clear: This condition does not cause constitutional weakness nor does it arise from constitutional weakness.

Pains, Sputum, and Cure of Tuberculosis.—*H. A. L. writes: "1. Do tuberculosis pains of the lungs come in the back? 2. Is black sputum at times a sign of tuberculosis? 3. Is there any certain cure for tuberculosis?"*

Reply.—1. Pain as a sign of consumption is not of any value. People who think they have consumption because of pains in the chest are generally mistaken in their diagnosis.

2. The black color of some sputum is due to soot and dirt. People who think they have consumption because of black sputum are generally mistaken.

3. No. Nothing is certain but death and taxes. If 100 people in the early stages of consumption change their methods of living and live right, 75 will get well. If 100 people in the late stages of consumption change their methods of living and live right, eight or ten will get well.

Preventing Consumption.—*J. L. B. writes: "I wish you would tell us a few ways of prevention of consumption, such as exercise, foods, and tonic."*

Reply.—1. Keep away from careless consumptives.
2. Keep away from dusty working places.
3. Keep out of ill-ventilated rooms.
4. Do not neglect colds.
5. Keep in the open air as much as possible.

Many other preventive measures could be suggested, but these are the most important.

Needs Medical Advice.—*Inquirer writes: "I wish to know if a slow form of tuberculosis is curable. Should one have the lungs examined every three or four months? I am short of breath and seem to get choked up, so I have to take deep breaths to get air. I cough a kind of a short bronchial cough quite often and my limbs have a tired ache almost all the time. I am nervous and am troubled with insomnia sometimes. I have been told it is useless to go to a physician for examination, as there is*

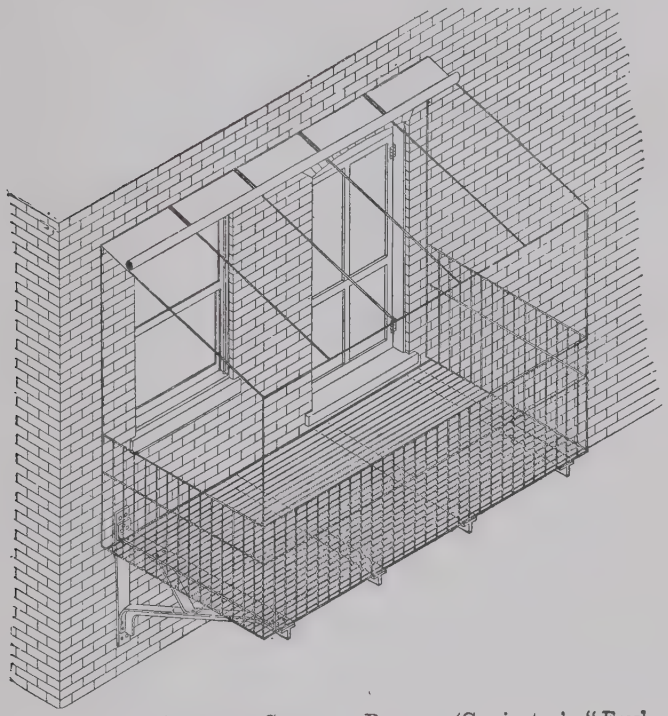


FIG. 49.—FRAME FOR ATTACHED SLEEPING PORCH. (Carrington's "Fresh Air and How to Use It.")

nothing to do but live in the air and sunshine and eat nourishing food. Please advise me what to do."

REPLY.—A fair percentage of cases of advanced tuberculosis get well. The person who told you that you did not need medical supervision gave you bad advice. You need advice as to how to live out of doors, what to eat and what not to eat, how to get sleep, how much or how little to exercise.

Where one has a disease like malaria, he may cure himself by a course of quinin and may need no medical guidance. Where one has a disease such as tuberculosis, for which no specific is known, he must have a pilot.

Enlargement of Glands.—*Reader writes: "What treatment would you advise for children threatened with tuberculosis of the glands of the back of the neck? Is it contagious? We sleep with the windows open, but the children are in school, thus preventing them from being out. Do you think it necessary to give them any medicine aside from cream, milk, olive oil, and the necessary foods?"*

Reply.—Enlargement of the glands of the neck may be due to tubercle bacilli or may be due to other bacteria. Unless they continue to absorb bacilli the enlargement can be expected to disappear. The condition is not contagious. The condition may be due to (1) dry, hot air in the schoolroom, (2) tubercular milk, (3) enlarged tonsils, (4) adenoids, (5) bad teeth, or several of these combined.

The remedy is to pasteurize the milk, see that the schoolroom air is cooler or moister or else take the children out of school, put them

In Hip Joint Disease the knee is drawn up when the back is straight.

In Hip Joint Disease the back bows when the leg is straightened.

Fig. 50.—Hip Joint Disease.

in an open window school, see that the tonsils and teeth are put in good condition, see that the children play out of doors, give them meat, bread, vegetables, fruit, and milk in abundance. Olive oil has no advantage over milk and butter and probably they do not care for it.

Tuberculosis of the Knee.—*M. M. R. asks if any cases of tuberculosis in the knee joint have been cured without causing permanent stiffness. His trouble is of seven years' duration, and for three years he has been wearing a cast which keeps the limb from bending. The result is that there is little motion left. When it is no longer sore and weak he asks if it can be "broken" to produce a good range of motion.*

Reply.—If tuberculosis in the joint is discovered early there is a possibility that it can be cured without permanent stiffness. After the disease has subsided, surgeons will be able to repair the injured joint and give a good range of motion.

Tuberculous Sores.—*Mrs. A. G. writes: "Kindly let me know if lupus of the nose of seven years' standing can be cured? Can a tuberculous sore of five years' standing on the face be cured?"*

Reply.—Lupus and tuberculous sores on the skin can be cured rather readily. Skin tuberculosis is about the mildest form of tuberculosis. If you will persist in proper care of your case under the direction of a competent physician, you will be cured.

Advice to a Consumptive.—*R. C. L. writes: "In the first stages of tuberculosis, where the patient has gained ten pounds weight and coughs very little, would it be advisable to come to Chicago in April, after spending the winter in western Texas?"*

Reply.—No.

Menace to Neighbors.—*Subscriber writes: "We have in our neighborhood a man who has had tuberculosis of the lungs for a year and a half. He has had several hemorrhages, yet he goes about the yards and gardens, his own and his neighbors', expectorating where he will, as well as all the way from his home to the station. Is not this a menace to the neighborhood? He also uses his handkerchief to expectorate into when in company indoors. These are sent out to be laundered. Is this right? After his eating at one's house should his dishes, etc., be boiled separately? If he persists in these things would it not be wise to cease visits, or is the risk not great?"*

Reply.—1. Yes, he is much of a menace to his family and something of a menace to the community.

2. No; it unnecessarily endangers those who work in the laundry.

3. Yes.

4. It would.

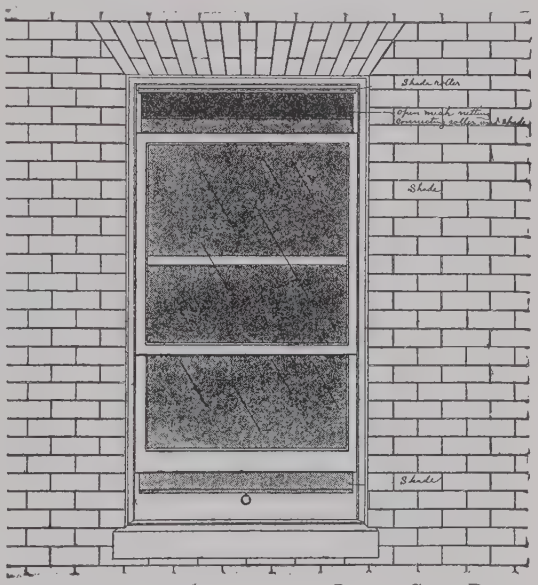


Fig. 51.—Window Ventilation: Lower Sash Raised, Upper Sash Lowered. Shade roller is placed several inches below top of window. Space between roller and top of window is covered by wire screening. (Carrington's "Fresh Air and How to Use It.")

Should Protect Girls.—H. F. W. *writes: "In a home a block from my house lives a woman badly afflicted with tuberculosis of the lungs. There are several girls in the home. My 13-year-old boy is frequently in the home and often sits in the hammock with the girls. Is there any danger?"*

Reply.—If the girls are well, no. If the girls are tuberculous, yes. Someone should see that proper effort is made to protect these girls. The chances are more than even that several of them will be found to be tubercular within two years from now.

Night Sweats.—*E. L. M. writes: "I have been having night sweats for the last two weeks. I had them about seven years ago. I do not drink liquor. I eat and sleep well. I have lost about ten pounds in the last two weeks. What would you advise me to do?"*

Reply.—I should say, if you have lost ten pounds in two weeks, and are having night sweats, you should have a physician discover the cause. Night sweat by itself is of no special consequence, but taken in conjunction with rapid loss of flesh is suspicious.

Consumption Cures.—*G. E. S. writes: "There are thousands of poor souls in the southwest, just hanging on to life in the hope that someone will find a cure for their terrible disease." He mentions a newspaper*

article, which said that a man in England claimed a cure by inhaling the odor of putrid meat. He asks about a cure which consists of an injection into the veins. He says the same man has a cure for pneumonia, which consists of injecting something hypodermically.

REPLY.—We know nothing of this cure for consumption. If there is anything in it that fact will be demonstrated. This seems slow to those poor souls who are waiting for a cure, yet it is the way which experience has shown to be the only way.

As a general proposition it can be stated that consumption cures are all worthless. Rest, feeding, and fresh air will cure all the early cases, about half of the moderately advanced cases, and a few of the late cases. The dry climate of the West will cure about 15 per cent of the cases which

FIG. 52.—RUSTIC HOUSE FOR SLEEPING OUT. (Carrington's "Fresh Air and How to Use It.")

cannot be cured in this climate (Chicago), provided the cases are properly directed. Cases without money will do better at home than in the West.

Tuberculin, properly used, adds about 25 per cent to the chance of getting the disease arrested and keeping it from recurring. Properly used it requires about six months to a year. Improperly used, it does more harm than good.

The hospitals, sanitaria, and laboratories are filled with men who are working to find a cure for the late cases—those with cavities. In the meantime advertised cures are worse than useless. They do harm. Many of them contain opium. They prevent people from taking air, rest, and feeding.

Tuberculin as a Cure for Consumption.—*J. K. writes: "So much has been written about vaccination against smallpox and typhoid that I think it about time to bring in the idea of the tuberculin vaccine or injection as it is properly called.*

"Now it is an understood fact that medicine taken into the stomach never cured tuberculosis; then we know that what a doctor prescribes is merely a tonic so as to build up the system and overcome the germs.

"Now then the modern treatment of injection is to immunize the ailing body to further attack and thus give the patient a chance to recover. Does this injection wear off in time? What chance has a person to recover from the disease? Is there a better treatment?"

REPLY.—Open air treatment of tuberculosis is the proper treatment, and you should not get the idea that tuberculin or any other serum will take its place. However, it is quite generally believed that tuberculin is a valuable aid to open air, and that by its use in connection with the open air treatment the chances of cure are materially improved. Trudeau has found that there is a further gain from using tuberculin in connection with the open air treatment, in that the people who have had their disease arrested are much more liable to remain well. The danger of a recurrence is greatly lessened. The estimate of the value of tuberculin is that it improves the chances of permanent cure about 18 to 25 per cent. It is not possible to get much advantage from the open air treatment without having good nursing and good medical supervision, and this is also true of the use of tuberculin.

I am not able to answer your question as to how long the effect of immunizing with tuberculin lasts. It was found in the case of vaccination of calves that it was not permanent.

The chance of a person recovering from consumption would depend upon several things. The most important thing is how early is his case. Early cases nearly all get well. As time goes on the chance of getting well decreases rapidly.

Treatment of Tuberculosis.—*H. A. J. writes: "What is the proper course of treatment, diet, etc., for pulmonary tuberculosis in an early stage?"*

REPLY.—The three important factors in the treatment of tuberculosis are food, rest, and fresh air. Meat, eggs, and milk in generous quantities are the staple articles. Cream, butter, fish, bread, vegetables, and fruits are added. Raw lean meat, soaked in water for two hours and finely chopped, may be given. The process of overfeeding must be carefully watched and indigestion prevented. Rest is very important. Fresh air and plenty of sunshine are essential. Cases that require such treatment need careful medical supervision.

Tuberculin Is of Value.—*J. W. writes: "I am very much worried about my neck, which has been operated on seven times for tubercular glands. These operations occurred in the last six years. Now they are growing again on both sides.*

"I thought I would ask you if there is anything else which might help me.

"Is tuberculin of any use in such a case, or would change of climate help? Otherwise my health is very good."

REPLY.—Tuberculin is of value. Change of climate is of value. But my suggestion is that you have your physician see if he cannot find where the bacilli get into your tissues—probably in your throat, possibly in your nose or mouth there is a place through which bacilli are entering to be stopped by the glands of your neck. You may say that the glands of your neck are the second gate. Cannot the first gate be found and attended to? Do you drink nothing but boiled milk?

Sun Better Than Sulphur.—*Anxious Contributor writes: "Is there any danger of infection in sleeping on a spring and mattress that was used by a tubercular patient, if disinfected with ordinary sulphur candles?"*

REPLY.—If the articles were properly disinfected there is no danger. In addition to the disinfection, sun them for several days. Several days' sunning will be as efficacious as steam disinfection and more so than sulphur.

Medicines No Use.—*A. F. T. writes: "What is the condition of a person's lungs described as fibroid? Does it mean the person has consumption? What ought he to do?"*

REPLY.—The frame-work—the scaffolding of the body—is called fibrous tissue. Whenever the proper tissue of a part wears out this scaffold tissue replaces it. The organ in which there is too much fibrous tissue is said to be fibroid.

A fibroid lung may result from slow, chronic consumption, one that has lasted five years or more. It may result from an old asthma or an old bronchitis. It is found in coal miners and others who breathe a great deal of dust.

When you are told that your lungs are fibroid ask whether it is tubercular. If the condition is due to tuberculosis, it is advisable to move to a drier climate. If it is due to coal dust, change occupation. Medicines will not be of service.

Why Consumptives Go West.—*W. J. M. writes: "Is it not a fact that the Arabs of the Sahara Desert are among the most virile and longest-lived people in the world? Is it not also true that mountaineers in all parts of the earth are exceptionally healthful? Now, we know that desert air is extremely dry, and that the air at high altitudes is much less humid on the average than it is at sea level. You recommend consumptives to seek high altitudes, 'preferably from 5,000 to 8,000 feet,' on account, as I suppose, of the low relative humidity.*

"What puzzles me is how you square these facts with your oft-repeated warning as to the injurious effects of dry air. Is it not possible that the bad physical conditions sometimes observed in persons who live in hot rooms in which the air is very dry may be caused solely by the heat and the lack of ventilation rather than by the dryness of the air?

"I lived for many years in a house which was heated by hot air, the temperature being maintained constantly, night and day, throughout the winter, at 68 degrees. The air supply was direct from out of doors, no water was evaporated, and the humidity was always far below normal. Under these conditions my health and that of all the other members of my family was excellent. The supposed injurious effects of living in a dry atmosphere certainly failed to materialize in our case. How about it?"

REPLY.—Arizona atmospheric air does not have as low a humidity by odds as house air in Chicago in winter. When you live in Chicago in winter, part of the day you are outside, where the humidity is, say, 90, and part you are inside, where the humidity is 25. In Arizona the humidity is rather evenly near 50. Consumptives go West for:

1. Humidity around 50.
2. Maximum sunshine.
3. Low precipitation.
4. Clean air.
5. Air low in bacteria, especially those which produce putrefaction.
6. Elevation.
7. Maximum possibility of being comfortable out of doors all of every day and night.

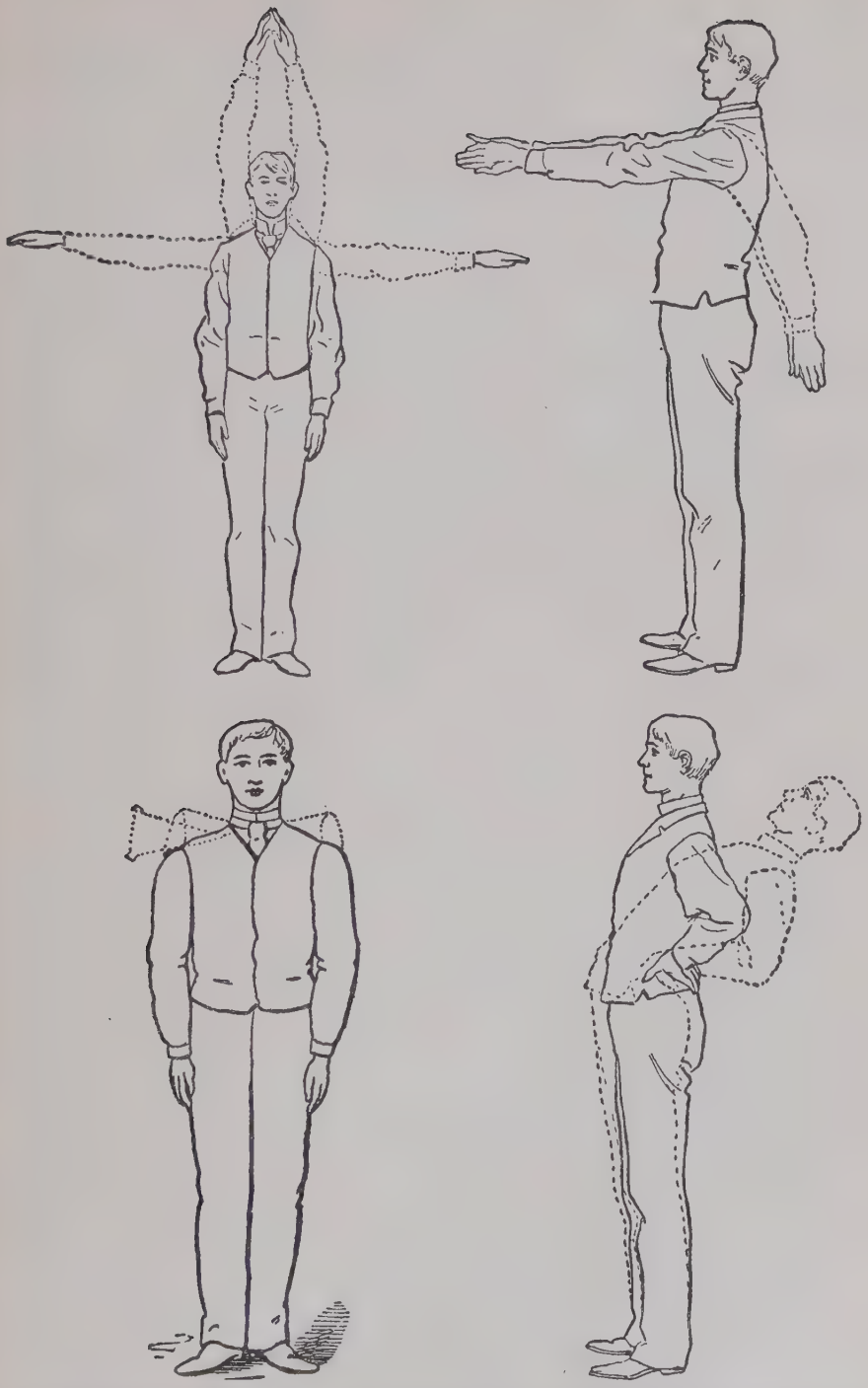


FIG. 53.—EXERCISES WHICH DEVELOP THE MUSCLES OF THE SHOULDERS, CHEST, BACK AND ABDOMEN.

The climate of the West is good for consumption; it is bad for other diseases and conditions. Low humidity is not the only benefit. In indoor air low humidity is not the only harmful quality. Not all people who breathe improper air die or get sick. If they did, Chicago would have been handed back to the Indians a long time ago.

Advice on a Cure for Tuberculosis.—*F. C. C. writes: "Kindly give me your opinion of the efficacy of the newly discovered 'deoraden' in the treatment of tuberculosis."*

Reply.—You had better let it be tried on the other fellow. Consumption gets well so frequently under rest, food, and air, that many remedies claim to cure that do not. No treatment can be judged of fairly until it has been used on enough people to satisfy the law of averages.

Going Away Question.—*J. K. writes: "Some months ago I had a hemorrhage. I took twelve treatments of tuberculin, and am now contemplating going to northwestern Texas or farther south into New Mexico, where the climate is milder and the altitude greater. I have had no hemorrhages since the first and have increased twelve pounds in weight. My occupation is that of bookkeeper. An examination previous to taking the treatment showed bacilli. Would a warmer climate of the same altitude be better than one subject to 'northers,' as Amarillo, Texas? If sputum shows bacilli at this time how soon should I take the second treatment of tuberculin? If I remain in Texas or New Mexico until May next could I with safety return to Chicago if I am of usual weight and apparently cured? Does the fact that I have regained my usual weight indicate that I have no tubercular germs?"*

Reply.—1. Amarillo, Texas, is a good place for a consumptive, but Arizona, or New Mexico, or Colorado is somewhat better. Do not try for a warm climate. Avoid places subject to "northers."

2. The presence or absence of tubercle bacilli does not determine the question. The proper method of treatment is to give it in slowly increasing doses about once a week, or at most twice, and to keep it up until about five drops of straight tuberculin cause no reaction.

3. If you have had bacilli in your sputum for several months, there is no probability that you can return to the city by spring. In fact, this third question is the key to the situation. I feel quite certain you are making a mistake in going away. He who goes away counting the months until he can return is not liable to return alive. There is some advantage in going to a better climate, but it is only for those who have money enough to sustain themselves without work for a year or more, for those who will not become homesick, for those who will go into a sanitarium or under the best of control.

4. No.

May Be Curable Consumption.—*V. L. writes: "Kindly tell me whether a morning temperature of 97.4 to 98 degrees is unusual. The afternoon temperature is about 98 degrees, but has times of running to 99.4 or 99.6 degrees. The person has a good color and seems well. She is free from heavy colds, but seems to have a slight cold constantly, and is subject to headaches that sometimes last three weeks. She is rather chilly in the morning and very suddenly becomes extremely tired toward the end of the afternoon. She is 5 feet 4½ inches tall and weighs 120 pounds."*

REPLY.—This reads like a history of early curable consumption. She should have an expert examination without delay.

Reason for Varying Advice.—*C. S. asks why some patients suffering from consumption are sent to one place and others to another.*

REPLY.—Whether a patient is to go to one place or another is dependent on:

1. Personal considerations.
2. Social considerations.
3. Sanitarium considerations.
4. Climatic considerations.

Patients go to Denver because they have friends there or hope to get some work, want city life, or sanitaria, as well as on account of the climate. It is highly desirable that the patient should be satisfied and happy.

Many patients are sent to places where there is a good sanitarium in which they will be controlled and closely studied. The physician sending patients away is wise if he gives great weight to sanitarium facilities.

Climate is the prime consideration in the advice given many patients. Here, too, the individuality of the patient must be taken into consideration. Generally speaking the requisites are:

1. Low relative atmospheric humidity.
2. High percentage cloudless days.
3. Low rain and dew precipitation.
4. Freedom from winds of velocity of more than twenty miles an hour.
5. Freedom from dust.
6. Elevation 1,000 to 8,000 feet, preferably 5,000 to 8,000.

Many physicians advise their patients to keep away from states and cities which have no laws regulating tuberculosis, or laws which are worthless.

Sanitaria About Denver.—*M. writes: "I wish you would let me know of any camp or tent colony at Denver for tuberculous patients. There is a boy, 18 years old, a printer by trade, who has just started for Denver. I imagine, from what he has told me, that the disease has advanced pretty far, as he says he has had four or five hemorrhages. The boy has little money, probably $100 in all, and, if there is a colony where he could live for two or three months at a nominal sum each week, I wish to write to him of it as soon as possible."*

REPLY.—If the boy is a member of the International Typographical Union and has been for five years, he is entitled to free care in the Union Printers' Home at Colorado Springs. The tuberculosis directory gives the following list of sanitaria in or near Denver:

Agnes Memorial, Association Health Farm, the Home, Mrs. Lare's Tent Sanitarium, National Jewish Hospital, Jewish Consumptive Relief, Sunlight, Swedish National, Evangelical Lutheran, Fern Hill.

It is most unfortunate that cases of this class go to Denver or elsewhere searching for a climate cure. With the little money at his command he stands but a slim chance of improving. He probably will shortly be penniless and helpless among strange people. His chances would have been better at home.

Breathing and Consumption.—*Dr. A. W. Foreman of White Hall, Illinois, says that for thirty years he has sent his tubercular patients to the*

Rocky Mountains with excellent results. The altitude he has found best is 5,000 feet. His explanation is that the air is poorer in oxygen, and the breathing must be deep in order to have the blood get enough oxygen. This brings into play all the air sacs. Lazy breathing is not possible. He has seen patients increase their chest measurements in this way three to four inches.

Reply.—The reasons consumptives do well in the Rocky Mountains are several. Elevation is one of them, and not the most important. In certain stages of the disease the lungs heal better when kept as quiet as possible; in others they get on better when breathing is deeper. So, deep breathing may do good or do harm.

Arizona Better Place.—*B. E. S. writes: "Do you consider the climate of Florida, say Tampa, or near there, a healthful place for one who has tuberculosis? If the rainfall there is between fifty and sixty inches, would that not be too damp? Is malaria prevalent there? Would the climate of Arizona be more beneficial?"*

Reply.—1. No.
2. Yes.
3. Yes. In the summer and fall; not in the winter and early spring.
4. Yes.

CHAPTER X

The Eye

PREVENTABLE BLINDNESS

The last edition of the Encyclopedia Britannica says: "The data furnished in various countries by the census in 1901 showed generally a decrease in blindness, due to the progress in medical science, use of antiseptics, better

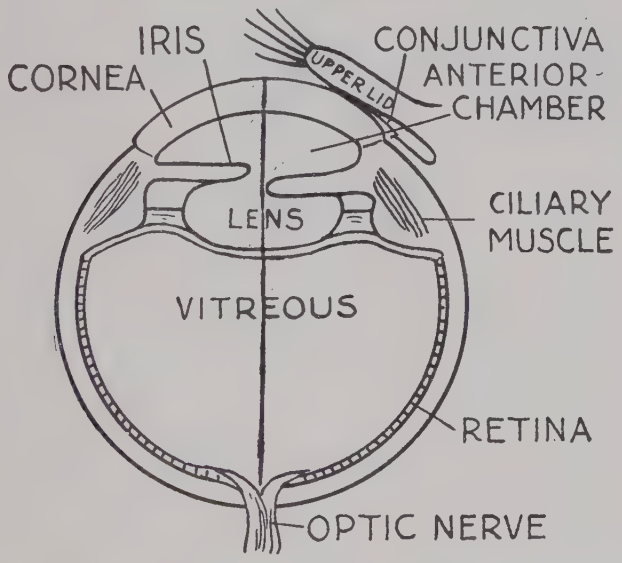


FIG. 54.—During accommodation the lens becomes more convex through contraction of the ciliary muscle, as shown in the left of the diagram, while to the right is shown the position of the lens at rest.

sanitation, control of infectious diseases, and better protection in shops and factories."

That blindness is on the decrease is much more apparent in recent years. This fact is a reason for still greater endeavor. We are winning a fight. The fact that we are winning calls on us for renewed, redoubled endeavor, that the enemy may be wholly routed.

The control of preventable blindness is a battle. The enemies are enumerated in the above opening quotation. We are making a winning fight. The statistics from England and Wales show that in 1851 there was one blind person for every 979 with sight, 1,021 blind for each 1,000,000 of the population. This fell during each decade. In 1901 there was one blind person to

every 1,285 able to see, 778 per 1,000,000 of the population. The decrease in blindness in the other countries of the world is at about the same rate.

However, much remains to be done. According to the census of 1900, there were 85,662 blind in the United States, 1,125 per 1,000,000.

The low blindness rate countries are Holland, 5,414; Denmark, 427; and Belgium, 487.

The high blindness rate lands are Russia, 2,000; Finland, 1,191; Italy, 1,175, and the United States, 1,125.

Dr. Alexander Graham Bell was appointed a special expert of the census

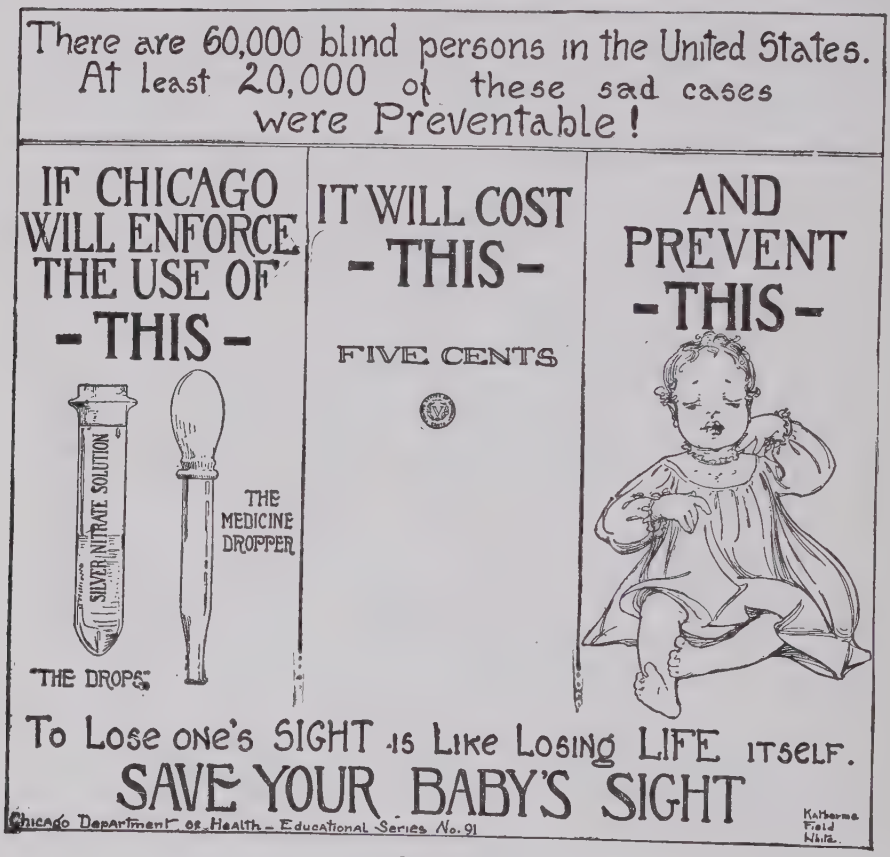

There are 60,000 blind persons in the United States.
At least 20,000 of these sad cases were Preventable!
IF CHICAGO WILL ENFORCE THE USE OF
- THIS -
SILVER NITRATE SOLUTION
THE MEDICINE DROPPER
THE DROPS
IT WILL COST
- THIS -
FIVE CENTS
AND PREVENT
- THIS -
To Lose one's SIGHT is Like Losing LIFE itself.
SAVE YOUR BABY'S SIGHT
Chicago Department of Health - Educational Series No. 91
Katherine Field Waite.

FIG. 55.

office to inquire into blindness in the United States. He investigated about 65,000 blind, making some interesting observations. Of this 65,000, 2,300 were under 10 years of age.

Some children under 10 years of age are blind by reason of accident, but the very important cause of blindness in this group is what is known as ophthalmia neonatorum. This term means infection of the eyes occurring during birth or within the first few days thereafter.

This form of blindness is preventable. The methods of prevention are known. They have been tried. They work.

Now the question is: Will the mothers see that the approved measures are carried out?

The method was devised by Crede, and goes by his name. It consists in dropping a drop of 2 per cent nitrate of silver solution into each eye of the newly born child immediately after the face has been carefully washed.

The cloths, grease, water, and soap used to cleanse the balance of the baby's body should not be used on his head. A separate lot of cloths and cleansing material should be used for the head.

To cleanse the eyelids, absorbent cotton should be used. The pledget used for one eye should not be used for the other. To wash the corners of the eyes and the margin of the lids, a little saturated solution of boracic acid should be employed.

The pledget of cotton saturated with boracic acid solution used on one eye should be thrown away at once, and not returned to the solution, lest an infection of one eye be carried to the other.

Next a drop of silver solution is put into each eye, followed a moment after by a few drops of 2 per cent salt solution.

If the eyes seem to be at all inflamed the doctor must be told without delay. This form of eye infection works very rapidly. If neglected for a few days, no doctor, however skillful, can save the sight.

Before Crede began the use of his method at the Leipsic Hospital, one in every eleven babies born in that hospital speedily lost its sight from this one type of infection. Within a short while the use of this method had reduced the blindness to one in every 1,000.

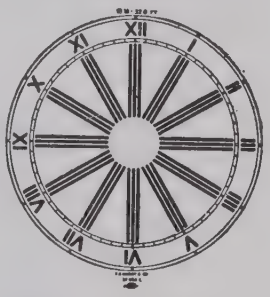


FIG. 56. — ASTIGMATISM CHART.—Test one eye at a time. If all the lines appear of the same shade astigmatism is *not* present. If any lines look darker or less clear than others, astigmatism *is* present.

Harmon's book on preventable blindness tells us that, of 25,317 blind investigated in England and Wales in the census of 1901, 489 were children under 5 years of age. According to Dr. Tivnen, of the blind treated in the Illinois Charitable Eye and Ear Infirmary in 1909 and 1910, 13 per cent were blind as the result of infection at birth.

Some other percentages also noted by Dr. Tivnen are as follows: Massachusetts Eye and Ear Infirmary, 1.04; Manhattan Eye and Ear Infirmary, .03; New York Eye and Ear Infirmary, .08. [Magnus' table for Germany, 10.8; Troussean's for France, 4.6; Oppenheimer's for the United States, 3.1.]

Anyone who thoughtlessly reads the above figures is liable to get an erroneous opinion. People go to infirmaries to be treated for conditions which can be relieved. It is only a small percentage of the blind people blind from birth who find their way to infirmaries.

Harmon says that an investigation of the causes of blindness among London school children showed that 25 per cent were so as the result of congenital defects, 36 per cent because of infections of the eyes at birth, and the remainder as the result of miscellaneous causes.

The percentage of ophthalmia neonatorum blindness to total blindness in children of school age for Berlin, Breslau, and Paris is around forty.

In ten state schools for the blind classified by Tivnen, the percentage

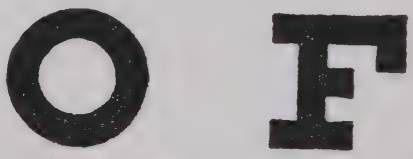
of birth caused blindness to total blindness ranged from 12.5 for the Connecticut school at Hartford in 1907 to 44 for the Pennsylvania school in 1909.

However, these figures are too high to be accepted as general averages.

Among the school children, and especially among the school for the blind children, the number of afflicted as a result of birth accident is disproportionately high. Much nearer a true figure are the following estimates:

The New York Association for the Blind goes on record as thinking that 10 per cent of the blindness is the result of this infection.

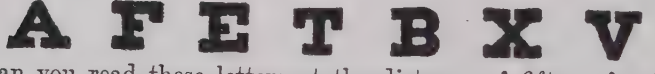
Then let us say that about one in each twenty of the blind people are blind because of neglect of their eyes at the time of birth and for a few days thereafter.



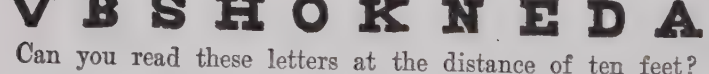
Can you read these letters at the distance of forty feet?

Can you read these letters at the distance of thirty feet?

Can you read these letters at the distance of twenty feet?



Can you read these letters at the distance of fifteen feet?



Can you read these letters at the distance of ten feet?

If so you are neither nearsighted nor farsighted.

The situation is serious enough to warrant effort. The percentage is decreasing; the fight is a winning one, and that is the second reason which warrants effort.

Dr. Parke Lewis thinks the state and city governments should pass laws making this infection of the eyes reportable. Many states and some cities now have such laws, but it has not been found easy to enforce them. Since nitrate of silver solution is unstable, uneven, and rather undependable, he would have the solution furnished, dated and ready for use, by the government. This is the practice in many states. He especially advocates measures for the education of the public.

Dr. Tivnen advocates education of the public and particularly of individuals. He would labor to secure the coöperation of medical societies, mothers' clubs, nurses, and individuals with the health departments to bring about the education.

In the meanwhile why not let each mother individually do her part? She can see to it that her baby does not go blind.

First, every mother should enter labor as free from infection as possible. But there is a way to guarantee the sight of the child even when the ideal condition of the mother is unattainable. She can understand the method.

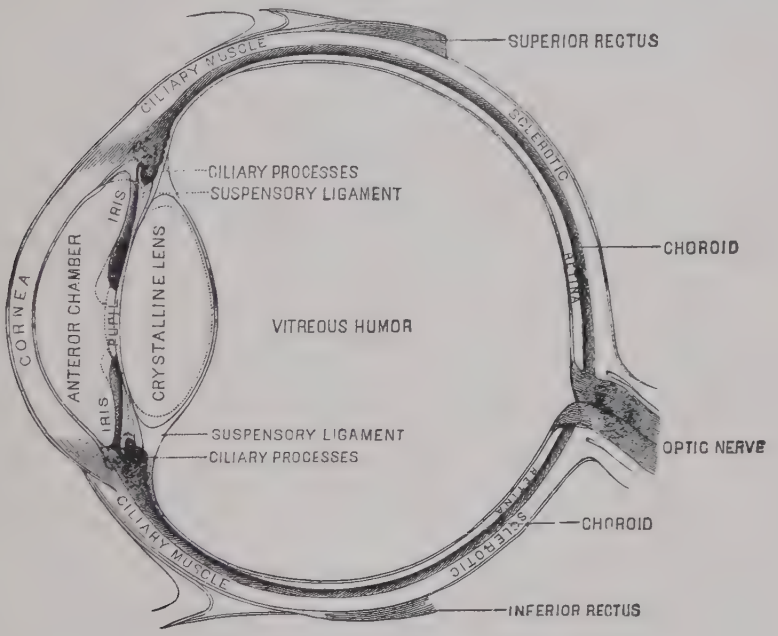


Fig. 57.—Diagrammatic Section of the Eyeball.

There is little to it, and she can see that it is carried out in the case of her child.

Another cause of preventable blindness is trachoma. Trachoma is said to have come from Egypt.

Napoleon went to Egypt with an army for the purpose of capturing a pyramid or some other white elephant. He got trachoma. Nearly every soldier of his 32,000 got trachoma. When he returned to Europe this modern Cleopatra refused to be left at home.

From the armies it spread to the people. From the European peoples it spread to the United States.

Not only is it to be found everywhere in the congested quarters of our great cities, but it has penetrated to the most inaccessible of our mountain populations. One of the great fights being made by McCormack in Kentucky is against trachoma among the pure-blooded Americans of the Blue Ridge Mountains.

The keynote of the trachoma situation is cleanliness. It is difficult to cure the cases of trachoma, but it is easy to prevent them. Prevention is more than a bargain. It is cheap. The necessity is for clean wash basins, clean water, clean soap, clean towels, clean hands, and clean faces.

It is highly desirable to have separate wash basins and separate towels under all circumstances. When a case of trachoma develops in a family, a school, or in a factory, what before was desirable becomes absolutely necessary.

FIG. 58.—SHOWING FOREIGN BODY ON SURFACE OF EVERTED UPPER LID.

Turning again to the tables prepared by Professor Bell, we find that nearly twice as many go blind between the ages of 10 and 19 as lose their sight under 10. I have never seen a close analysis of the causes of blindness in this group. Some of them are the result of smallpox; some of cerebrospinal meningitis, and more are due to other infections.

Looming large in this group are the accidents of play. The "sane Fourth" movement has demonstrated that the play customs of children need not endanger their sight. I am sure that the census of 1920 will show a smaller number of cases of blindness that are the result of the accidents of play.

A large portion of this group, though, is due to accidents of work rather than to accidents of play. The "safety first" movement has had a marvelous growth in the last five years. Born out of the flood of workingmen's compensation laws which were passed after 1905, this movement has had the moral and financial support of large corporations and men of brains, energy, judgment, organizing ability, as well as means.

On no part of their program is there more concentration of energy than that relating to protection of the eyes. It will be ten years before the result of these activities can be seen in statistics.

I learn that the chief difficulty is with the men themselves. Goggles are a nuisance. They are in the way; they are hot. The glass gets covered with dust or clouded with moisture.

I have often seen workingmen picking particles from each other's eyes. I have seen them picking out iron particles with a knife blade and other particles with a handkerchief. They are adept at it. But every now and then an eye becomes infected; the sight is lost, and sympathetic ophthalmia costs the sight of the second eye.

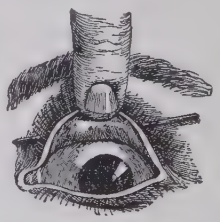


FIG. 59. — SHOWING METHOD OF EVERTING UPPER LID, USING A TOOTH PICK AND FINGER. Foreign body is seen near end of finger.

The remedy is the use of shields and goggles. Because the men will not always do what is best for them the facilities around factories for caring for injured eyes should be improved.

Professor Bell found that one in each twenty persons between 90 and 100 years of age was blind. For those over 100 the rate was one in fourteen. Among the old are to be found the congenitally blind, the blind from trachoma and from accident, and to these have been added those blind from the changes of age, including cataract.

Cataract is to be found among the old of every land, but some peoples

are more subject than others. It is much more common in hot countries than in cold ones. It is said that in Egypt one person in every fifty is blind, and cataract seems to be more prevalent in India than in any other portion of the world.

Among workingmen, glass blowers are noted for having cataract.

There has been a great deal of discussion of the cause of cataract among people in hot countries and among men working at hot occupations.

It has been charged to the glaring sunlight, the dust and the dryness of the air. Some have thought it due to ultraviolet rays.

So far as glass blowers are concerned, the tendency of the times is to charge it to the effects of the heat on the cornea and lens.

Whatever the condition is due to, some part of it can be prevented and some remedied.

THE SIGHT FAILS

There are a number of conditions of the eye which tend inevitably, at least in a fair proportion of the cases, to blindness. The result can be foreseen a long time in advance. In some of these diseases death can be foretold. For instance, when the blindness results from Bright's disease, death within less than two years can be expected.

In a case in which inevitable blindness is in prospect and the outlook for a long life is good, it is the duty of the physician to inform the unfortunate person frankly yet sympathetically of what is in store for him. Given an opportunity, he can then equip himself to increase his capacity for work and pleasure.

Dr. Parke Lewis, in his pamphlet entitled "Preparations for the Oncoming of Blindness," says: "Of first importance is it that he continue actively in the world's work."

Warned, he may devote the months of fading sight to training his other faculties to take the place of sight. In the first place he should learn to typewrite, making use of the touch system. He should train his fingers to read rapidly manuscript prepared for the blind. He should learn to carry on his present occupation without the use of his eyes, or else he should learn and become settled in a new occupation, one that can be carried on without the use of sight.

During this period of failing sight he can learn orderly habits for his wardrobe that will enable him to pick linen or to choose cravats without seeing. He can train his touch and muscle sense so that he can find his way around and avoid dangers and accidents. He can learn to sense his surroundings, to see with his fingers.

Given some months of warning, fully understanding the meaning of his infirmity, and with a will to overcome difficulties, he may train himself for a life of usefulness and happiness. It is not necessary that he should become antisocial, embittered, soured, morose, morbid, careless, or even inefficient.

Some of the happiest people have been blind. Some of the most useful people have been sightless. Not only have some of the greatest geniuses of the world seemingly had their talents increased by blindness, but some people with ordinary minds have not let blindness cut them off from useful lives.

Some men who, while they had sight, labored with their hands, who seemingly had no talent but pluck, after losing their sight have led efficient lives.

The period of failing sight offers an invaluable opportunity for training for blindness—training of body, mind, and soul.

TRACHOMA

Trachoma is one of the diseases which the old-style health officer missed completely. He might pore over death returns as long as he pleased and still be in ignorance of trachoma. A health department which concerned itself with diseases usually fatal would miss it entirely. *It is not until health departments become interested in increasing efficiency that they take notice of trachoma, for trachoma blinds but does not kill.*

It is not until health departments go gunning for defects, calling the adventure sanitary surveying, or health surveying, or some similar name, that trachoma is thought worth while. The man with trachoma must be sought out. Rarely does he come of his own accord. The condition is so mild, so symptomless, so free from pain, so slowly progressive that the subject sees the shadows slowly close around him, the light slowly fade away, and makes little effort to save himself, or makes some effort but is easily discouraged.

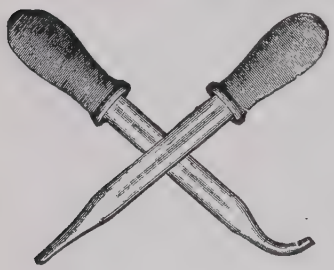


FIG. 60.—EYEDROPPER.

The government has inspectors who try to turn back immigrants with trachoma because, at one time, it was a European disease and we thought our uncrowded people were free from it.

Some good authorities hold that trachoma is not a specific disease due to one germ, but that it may develop from any case of neglected sore eyes. These people hold that, where many people use the same wash basin and the same towel, the "sore eyes" of the one presently become the trachoma of the group. At any rate, trachoma is now as abundant in the United States as in Europe.

Kentucky is making a trachoma survey. They have examined about 4,000 people in Knott, Perry, Leslie, Breathitt, Lee, Owsley, and Clark counties and have found that about one out of every eight has trachoma. Six of these countries are in the mountains and one is in the blue grass country.

The physicians at the Hebrew Dispensary, Chicago, have no trouble in finding cases by the hundred among the people who come to them. The probability is that a nationwide survey would show trachoma in all parts of the United States and among all classes of people.

We of the city are wont to think there is no sickness and disability among the people who live in the pure air and sunlight of the mountains. The people of the neglected mountain country see the great machinery for human care in the cities and conclude there can be no eyes developing trachoma from neglect in such surroundings.

There is an Arkansas story of a log camp lad who marveled at the clothes brushes, shoe brushes, hair brushes, tooth brushes, towels and soap of a city

visitor and exclaimed: "Is yo' always that much trouble to yo'sef?" The heart of the trachoma situation is in being trouble to "yo'sef"—care of the eyes by oneself, by the parent, by physicians, by the school authorities, by boards of health.

Trachoma is a chronic inflammation similar to, and may be just what we formerly called granular eyelids. In time the scar tissue contracts and pulls the lids away so that the eyeball is not properly protected and is harmed. It is contagious. It kills nobody, but reduces the efficiency of many people, especially in the crowded districts in the city. It puts many otherwise able-bodied people on charity or in county institutions. It burdens families and is a heavy drag on taxpayers and philanthropists supporting homes and hospitals.

A while ago somebody became suspicious that there was trachoma among the school children of Tuscaloosa, Alabama. The attention of the public health service was called to the situation and it sent Dr. Herring there to investigate. He examined the entire school population of Tuscaloosa, 1,122 pupils, of every station in life, and in addition 497 students in rural schools in the neighboring country.

He found that one child out of about every twenty positively had trachoma, and, in addition, the eyes were suspicious of trachoma in one out of about every sixteen. If these be counted as cases it means that in Tuscaloosa one school child out of every nine has trachoma.

Neglected trachoma is a serious disease. In the first place it is catching. It is spread by towels, wash basins, handkerchiefs, fingers. Unlike pink eye, it does not tend to get well. On the contrary, it tends to get slowly worse and in time to impair the sight seriously.

It passes through a stage wherein there are granular lids and a little mattering of the eyes. In this stage light hurts the eyes; the sight is slightly impaired, and headaches are frequent.

It finally enters the cicatricial stage. In this stage the lids are drawn in, or out, or down. They are persistently red along the edge. The vision is very much impaired. The poor vision may result in persistent headaches and other forms of nervous disturbance. In this late stage the disease is not thought to be contagious.

However, before either of these stages is reached there is a stage on which I want to center attention. Get it clear in your mind, even if you must forget the other stages. The eyelids are opened not more than half so far as if normal. The eye looks out through a narrow fissure. In most cases the lids are stuck together in the morning and there is a little matter in the inner corner.

A little mucus-like secretion is sometimes found in the corner of the eyes during the day. Light is a little unpleasant. These signs may not mean anything more than pink eye; or, if they keep it up, may not mean anything except eye strain, need for glasses.

The majority of the children in Tuscaloosa found to have trachoma did not think their eyes were wrong in any way. In the case of some of them the parents thought there was some trouble with the eyes and if it did not get well shortly they would have glasses for their children.

These symptoms do not necessarily mean trachoma. They indicate that

suspicion of trachoma is justified. When an eye man sees these cases he turns the lids out.

If trachoma is present he will find small rounded red elevations mostly just inside the margin of the lower lid. There may be small solid red spots in the same location on the upper lid. The lids may be slightly thickened. The eyeball may be involved. A little redness of the inner portion of the eyeball is almost certain to be found. There may be a little matter under the lids. Trachoma in this stage is actively contagious.

This is the combination that makes it necessary for fathers and mothers to know about trachoma (it is not enough that the physicians know about it), an actively contagious disease, causing very little annoyance and yet inevitably bound to injure the eyes seriously.

Conditions like those found in Tuscaloosa have been found in so many places in all sections of the United States that no town is justified in thinking trachoma of no importance to its people.

EYE FATIGUE

Alger says, "When one stops to think that most people use their eyes almost constantly and that many tasks involve a continuous strain for hours at a time, one begins to understand why vision necessitates expenditures of nerve and muscle energy beyond almost any other function."

There are three types of eye fatigue which show themselves in different trades. Gilders and polishers and all others who watch bright surfaces or look at bright lights suffer from eyestrain, which is the result of retinal fatigue.

Holden tells us that for a long time fatigue from strain on the eye muscles was a student's monopoly. Nobody suffered from eye headaches but the bookworms. Now the students, thanks to glasses, better lighting, and better printing, have almost got out of the class having eye headaches, but certain kinds of workers have moved into it.

Today there are many trades in which the worker sits hour after hour intently watching some machine. The same picture is being constantly repeated on the same part of the eye mirror hour after hour. So long as everything goes well the worker has nothing to do, but if anything goes wrong, he must see it and see it quickly. To do this he keeps his eye muscles in the same state of contraction all day long. His muscles get tired; his nerves get tired; his brain gets tired.

The garment workers probably are the most unfortunate of the lot. Their eyes are under a great strain. The muscles which control their eyes are overworked. Usually they work in badly ventilated rooms. The light is even poorer than the air. As Alger says, "If they allow their eye muscles to relax a second it means indistinct vision and that means mistakes in their work, and that means fines and deductions." The margin between earnings and the cost of living is not great enough to allow for many fines.

They need extra good muscles to stand this strain. Nothing in their lives makes for good muscles. Their muscle strain passes into neurasthenia and general tire. Therefore it is that a large part of the garment workers

are neurasthenic. Nothing is more hysteric and neurasthenic than a garment makers' strike.

The employer whose factory conditions make against mental poise at times feels most keenly the effect of that lack of poise. Whenever an employer thinks his employees are most hysterical, it is well for him to inquire if the conditions of his employment do not make for hysteria.

Miner's nystagmus, a jerking of the muscles which move the eyeballs, is the result of another kind of eyestrain. Cohen found that 45 per cent of the German lithographers and 51 per cent of the typesetters suffered from progressive nearsightedness. In addition, he found that 10 per cent of the blind-

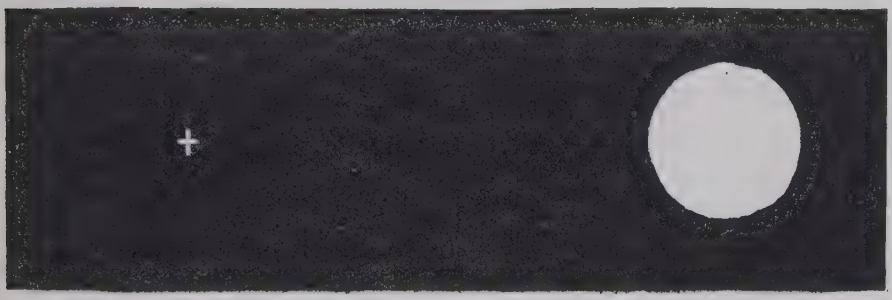


FIG. 61.—IN EVERY NORMAL EYE THERE IS A NORMAL BLIND AREA. Close one eye and gaze steadily at the cross. Hold the paper ten or twelve inches from the eye Move it to and from the eye. At the proper distance the white spot will not be seen.

ness in Germany developed out of this variety of shortsightedness. Ordinary shortsightedness tends to be automatically corrected as age advances.

DANGER TO THE EYES

Nature intended that man should see. For the purpose a most intricate piece of apparatus was made—the eye. No machine made by man is so elaborate or so perfectly put together. This machine is made in duplicate. It is covered well and provided with a well-nigh perfect dust removing apparatus. To serve it twelve muscles are provided. Of the twelve important nerves which come off directly from the brain, one-third, or four, are for the service of the eyes.

As we start off, or soon after, we are endowed with good eyes. How do we preserve the asset given us? If we work at certain occupations we ruin it.

The eye suffers from some industrial poisonings. Probably the worst of these is that from wood alcohol. Wood alcohol is now used for many purposes. In some its presence is not suspected. For instance, Tyler reports a whole room of girls who had eye trouble from shellacking pencils.

Alger gives other industrial poisons harming the eyes, such as chemicals used in making rubber, explosives and anilins. Tobacco and lead workers also suffer from poisoning of the eye nerve.

The eyes are mechanically hazarded in all dusty trades. Among those who suffer are the men who work over emery wheels, and also the metal and stone

polishers. Masons and plasterers usually suffer from lime in the eyes. Flour mill employees have eye trouble; so do hop pickers.

An exceedingly bad eye condition is that which develops in workers around arc lamps and other highly intense lights. These lights produce many violet and ultraviolet rays. The lens and the outer coats of the eye take up most of these rays, but some get through, and such destroy the visual purple faster than it can recover.

There results a condition of fatigue akin to snow blindness. The retina may fall away. The nerve may be destroyed.

Closely akin are the eye troubles of stokers, bottle-makers and glass-blowers, as the result of the intense light of the open fires or the molten glass. One observer found 40 per cent of the bottle-makers in one establishment had beginning cataract, even though the great majority of them were less than forty years old. The left eye, the one nearest the fire, was the more affected. Heat seems to be more important than light in causing glass-blowers' cataract.

The lens of the eye differs from the lens of a microscope in that it is soft and gelatinous. The eye, being a combined microscope, telescope, and several other kinds of scope, must have a lens which for one work can be molded into the form best for a microscope and for another use into the form best for a telescope. To mold it, special muscles are provided.

However, a lens which has not been fairly treated will age. It ages by passing from a gelatinous-like mass into a solid mass. It may finally pass into almost a stony mass.

This aging is called cataract. The importance of cataract from the health and efficiency standpoint is well understood.

There is need that attention be called to the fatigue of eye, of body and of mind which come while the cataract is in the making—the season when no eye specialist can tell that a cataract is to come next Christmas or next fall. While the man is developing this condition of extreme wear, it will be certain that he is suffering from other forms of fatigue.

SMITH CATARACT TREATMENT

Out of India has come the most used and the most discussed operative procedure for the eye of this century. According to the old methods cataracts were not operated on until the sight had been lost. An English army surgeon, Colonel Smith, working in India, devised a method which makes it possible to operate on green cataracts as well as on old opaque ones.

The following is the usual history: A man past middle life notices that his vision is failing. He goes to see his family physician, who examines his urine and finds it normal; then makes a physical examination and finds nothing wrong, and then sends him to an eye specialist. The eye specialist tells him that he has a cataract, and nothing can be done until the cataract has ripened. A year or so later, after the man has been unable to work for months or years, he is ready for operation.

That was the old way. The Smith way is to operate upon a cataract as soon as it begins seriously to disturb the vision. Whenever the sight gets

20-70 or worse the eye is ready for operation. A man with a vision of 20-70 sees well enough to work; his general health is good; he is in no sense disabled.

The old operation removed the cataract and left the capsule. The Smith operation removes the cataract in its capsule.

Smith was stuck away at a remote point in India. Cataract was a common complaint. The people were poor. They could not carry the burden of blindness from cataract while awaiting the ripening. They must be operated on as soon as the vision became impaired.

Furthermore, they could not lay up for after-treatment. The operation must be one that required little or no after-treatment. The Smith operation was devised to meet these requirements.

Smith has operated on more than 30,000 cataracts. In the Punjab there are 20,000,000 people, and 25,000 cataract operations are done each year. Ninety

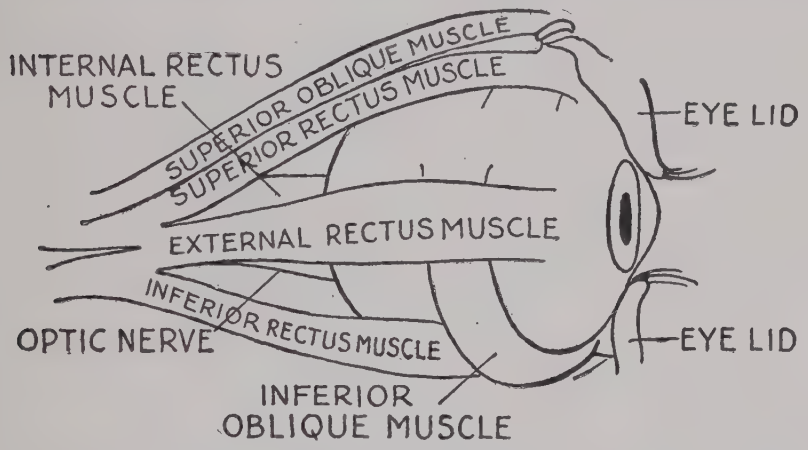


FIG. 62.—OUTSIDE OF EYEBALL. Muscles which move the eyeball upward, downward, outward, inward and obliquely.

per cent of them, or about 22,500, are done by the Smith method. Most of the eye men in India are using this method.

For some reason cataract is unusually prevalent in India, as has been known for years, and the eye men in India have had the richest experience in the world. Furthermore, the experience with this operation has extended over several years.

Those who read this volume are not interested in the finer technical points of operations or the ordinary points of advantage of one operation over another. They are interested, however, in a procedure that does away with the old time months or years of near-blindness while waiting for the cataract to ripen.

If this procedure can make good, the man with the cataract need not lose more than a month all told from his work, waiting for operation and after-care combined. The word of men who have performed the operation 25,000 times is that it has made good.

For a number of years eye specialists from all over the world have been going to India to learn the method. Many of them are in the United States

doing the operation as occasion offers. Some have done more than 500 of these operations—not a Smith record, but a rich experience as cataract experiences in this country go.

SQUINT

Strabismus (squint) exists whenever the two eyes are not directed toward the same object. Normally the action of the ocular muscles is such as to keep both visual lines always directed to the object under regard and, although each eye receives its own image, only one object is perceived by the brain, because the images are formed on the same corresponding parts of the retina.

If, owing to faulty action of one or more of the ocular muscles, one eye deviates and the visual lines cease to be directed toward the same object, two

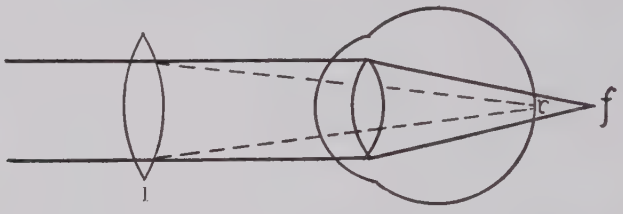


Fig. 63.—Far-sighted (hyperopic) Eye. Focusing Parallel Rays of Light Behind Retina at a Convex Glass (l) is required to Converge the Rays (dotted line) so They Will Focus Exactly in the Retina at r.

images of the same object are seen, but on nonidentical parts of the retina, and the result is double vision.

To avoid this inconvenience patients for the most part soon learn to ignore or suppress the image formed in the squinting eye, the result usually being that this eye becomes defective. This power of suppressing the false image is learned most easily in early life, and hence the necessity for early treatment of squint to avoid this.

Squint may be either paralytic or nonparalytic. Nonparalytic squint in children may be either congenital or acquired. The general causes of acquired squint are imperfect vision in one eye from opacities of the cornea or diseases of the choroid, retina, or optic nerve, rendering it unable to participate in binocular single vision.

Causes of paralytic squint may affect either the muscles themselves, the nerve trunks, or the nerve centers. Lesions of the nerve trunks are most frequent and are caused by syphilis, rheumatism, hemorrhage, tumors, alcoholism, influenza, and other acute diseases. Paralytic squint may be congenital. In the early stages of paralytic squint the treatment will depend upon the cause.

Non-paralytic squint is more common and occurs in early childhood. It is convergent; that is, one eye turns in toward the nose. The defect is manifested early in life—in fact, when the child begins to use his eyes for near vision, looking at picture books, etc. The majority of such children develop a squint before the age of three.

As a rule the squint develops slowly, and the parents are not the first

to notice it. They generally assign as the cause an illness such as measles or the imitation of a squinting companion.

In some cases we observe the squint only when the child gazes on a near subject. In others the squint is constant, but more marked when the focusing power is brought into play or when the child is tired. Most children who see equally well with each eye often squint with either indifferently.

Contrary to the common belief, children seldom "grow out" of it. If neglected, the squinting eye usually becomes blind from disuse. Neglected "cross eyes" are responsible for many blind eyes in adults.

If prescribed sufficiently early, correct glasses accomplish cures in many of the cases. Even very young children can wear glasses without danger.

The treatment by glasses, which is so efficacious in the young, is naturally much less so in older patients who have had squint for some years, and then operative interference is necessary.

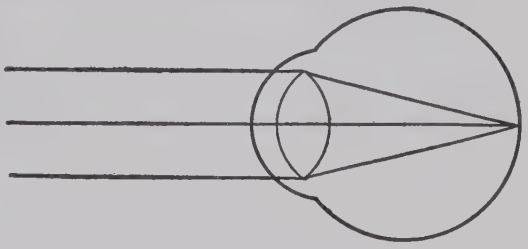


Fig. 64.—Focusing of Light Rays in a Normal (emmetropic) Eye.

The condition where the eye turns out is rarely seen in young children and mostly develops at puberty or later—in fact, when myopia or nearsightedness is progressing. In the majority of cases, when once developed, nothing short of operation is any good.

Cross eye and cock eye are varieties of squint. A person has squint if, when he looks at an object, one eye is directed toward that object while the other is aimed in another direction. Normally, the muscles of the two eyeballs work together so that both eyes aim at the same object. Under these circumstances, the light rays carry the image to the same spot on the retina of each eye. The imprint of these images is carried by the optic nerve to the visual area in the brain in such a way as to merge them as one image. The brain sees a single picture.

Sometimes the balance of power between the opposing muscles for the eyeball is lost. If the muscles on the nose side are too strong the eye "crosses." Sometimes one, sometimes both eyes "cross." If the outside muscle is too strong the eye turns out.

The picture on the retina is the image of the picture at which that particular eye is aimed. When a cross-eyed person looks at a thing he aims one eye at it. The image on the retina of that eye is a picture of the object viewed. But the other eye is aimed at something else. On its retina there is a picture of the object it is viewing. The optic nerves send in two pictures to the sight center in the brain. The sight center can only record one of them.

When rays of light enter the eye they pass through the lens and from there to the dark chamber to the retina. The dark chamber has a shutter. The shutter is the iris. The hole in the shutter is the pupil.

Syphilis of the eye affects especially the shutter, the iris. Inflammation of the iris is called "iritis." While the spirochetes of syphilis may locate in any part of the eyeball they show a liking for the iris.

Syphilis of the eye causes blindness, though it is less important than gonorrhea from this standpoint. Physicians are able to diagnose syphilitic iritis from the appearance of the eye as seen with proper instruments. If there is a doubt a Wassermann test will establish the diagnosis. The constitutional treatment for syphilitic iritis is that of syphilis elsewhere in the body.

PINK EYE

Pink eye is frequently the result of a scratch from dust or some other foreign body. At the season of the year when the wind and dust are spreading infection of all kinds there are many cases of sore eyes. In most cases only the mucous membrane lining the lids and covering the eyeballs is involved. The eyes are red and there is a discharge that sticks the lids together in the morning. They feel heavy and burn, but there is no actual pain. There is a sensation as though there were sand in the eye. In many cases only one eye is involved at first, but soon the infection goes over to the other eye.

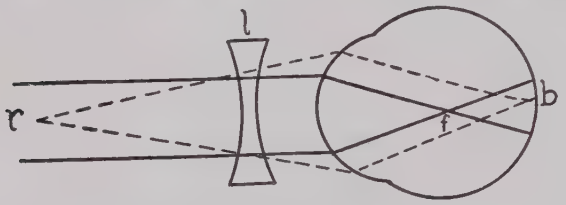


FIG. 65.—NEAR-SIGHTED OR MYOPIC EYE FOCUSING PARALLEL RAYS FROM A DISTANT OBJECT AT f IN FRONT OF RETINA. A CONCAVE LENS (l) WILL CAUSE PARALLEL RAYS TO DIVERGE, AS FROM A NEAR OBJECT (r), AND SO FOCUS EXACTLY ON THE RETINA AT b.

If the eyes are kept clean and free from discharge the inflammation will be over in from four to ten days. The discharge from such an eye is infectious. People who have pink eye should not use towels or handkerchiefs that may later be used by another person. Failure to observe this precaution is the reason why this condition "makes the rounds." It frequently does this in schools, boarding houses, and business institutions.

There is a serious side to attacks of pink eye. Occasionally the cornea or clear part in front of the eyes becomes involved, and ulcers form. The ulcers of the cornea are very grave because the scars they leave interfere with vision.

Inflammation of the inside of the eye is sometimes associated with pink eye. The danger signals warning us of one or more serious conditions are pain, dimness of vision, and swelling. Any one of these three should make us go at once to a physician competent to treat diseases of the eye.

When pink eye is caused by a spark from a cigar or a piece of hot ash, a drop of olive oil or castor oil will usually relieve the pain until medical advice can be had.

Cannot Dissolve Cataract.—*P. J. H. writes: "For several years, as the result of hemorrhages of the retina, there has been a bluish or grayish matter just inside the pupil of my right eye, causing total blindness in that eye. Recently I met a physician who said that he had a liquid which was to be dropped in the eye twice daily and by this method cataracts and similar growths were absorbed. He does not claim that it does the work in all cases, but that it is effective in a large percentage of cases, and that*

it is harmless. By this method he claims the lens is saved, whereas by an operation for cataract it is removed. Do you know anything about this method? If so, is it harmless and is it advisable to take the treatment? This physician seems to be honest.

"2. How can one determine whether a physician is honest or a quack?

"3. I am going South to stay for some time in or near pine woods. Have been told that in those regions the wood tick, if it gets on a person, causes a fever that is always fatal. Is this so and what should one do to avoid it?"

REPLY.—1. No liquid has any such power. Drops to dissolve cataract and absorb retinal hemorrhage are a fake. Furthermore, they have been exposed and denounced as frauds any number of times.

2. One way is to read the exposures of frauds in the newspapers and

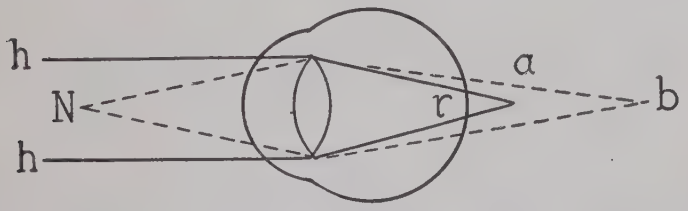


FIG. 66.—FAR-SIGHTED (hyperopic) EYE SHOWING THE FOCUSING OF RAYS FROM NEAR (n) AND FAR OBJECTS (h.h.) BEHIND THE RETINA.

to clip and preserve the items. This paper has a fairly extensive card index of frauds and quacks, and we will answer inquiries about any that we have on our list. The American Medical Association has a better list of frauds than ours, and they are willing to answer inquiries as far as they can.

3. The bite of the ordinary wood tick is never fatal. You have in mind the spotted tick found in a small area in Montana. To grease the "bite" with butter kills the tick and helps the bite. This is enough to do. Many of our correspondents have sent us their remedies. These have appeared in the *Tribune*.

Trachoma.—*E. B. writes: "Will you kindly publish a cure for trachoma; also the symptoms and results, if not cured?"*

REPLY.—Trachoma is a chronic inflammation of the covering of the eye and lining of the lids. It is the result of an infection. It is contagious.

Most of the cases of granular sore eyes or granular lids are cases of trachoma.

After the lids have been mildly inflamed for a long time the scar tissue begins to contract and deform them. They may turn in; whereupon the eyelashes scratch the eyeball or turn out.

No home treatment is of service in bringing about a cure. Some physicians treat trachoma by scraping away the granulation; some by local applications of antiseptics and caustics.

To prevent it, when you must associate with people who have it, be certain to use individual face bowls and face towels and hand towels. Keep your hands very clean.

Granular Lids.—*Mrs. A. F. writes: "1. What is the cause of granulated eyelids? 2. Is yellow oxid of mercury in ointment applied to the lids beneficial? 3. Is there any danger of mercuric poisoning from using it in the eyelids of a healthy child of 3 years? 4. What causes dandruff? 5. What removes dandruff and causes it to disappear permanently?"*

Reply.—1. Granulated lids is a term loosely used. Frequently it means trachoma—an infectious disease. Find out if your child has trachoma.

2. Ointment of yellow oxid of mercury is good for many affections of the lids.

3. No.

4. Some cases mean that the scalp has not been kept clean enough. Other cases are due to some skin germ not identified. The very bad cases in babies, sometimes called dandruff, are due to faulty nutrition.

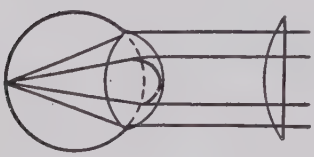


Fig. 67.—Simple Hyperopic Astigmatism Shown in Succeeding Figure Corrected by a Convex Cylindrical Glass. In astigmatism the curve of the lens or cornea is irregular and uneven.

5. Frequent washing, followed by the use of a little grease and good brushing, will remedy many cases. Resorcin ointment is serviceable in others; sulphur in others.

Floating Spots.—*E. C. M. writes: "For the last ten years I have been troubled with black floating spots and rings before the eye. I have been wearing glasses for four years, but they do not do away with the spots. My work is that of bookkeeping and of course my eyes are at constant strain. Will my eyes in time get worse with more spots or is there no danger in them? I am also troubled with catarrh in the nose and throat. Has this an effect on the eyes? Has the stomach anything to do with the eyes?"*

Reply.—Floating spots before the eyes are of no consequence. They occasion unnecessary worry. Exercise proper care to have the light fall on your books right, adjust your glasses as they need to be adjusted from time to time, and you will be doing all you can to preserve your eyes. It is not probable that your eyes are affected either by your nose or your stomach.

Rings Before the Eyes.—*J. S. R. writes: "I have been annoyed by small rings and double lines in front of my eyes. They flow in front of my sight. There is one set of rings within a double line, and whenever I look on white objects I always see this as a large spot dancing in front of me. What must I do to get rid of these?"*

Reply.—There is nothing that you can do. No harm will come from them. Pay no attention. They will never injure your sight.

Cause of Infant Blindness.—*M. H. writes: "The baby of my friend, a neighbor, had sore eyes at birth and became blind. A doctor has told me that it was no doubt the result of a venereal infection. He said that a great many innocent young wives are infected by their husbands, and abdominal operations are sometimes necessary to save their lives. He quoted Dr. Joseph Price of Philadelphia as saying that 95 per cent. of his abdominal operations on women—usually innocent women—are for such infections. If this or a tenth part be true, what shall we do to protect our*

daughters? The great majority of your readers, like myself, are entirely ignorant of such dangers."

REPLY.—Your informant is probably correct. The baby is blind because of an infection of its eyes with gonococcus. To prevent this, the eyes of newly born babies should be washed in a weak silver solution soon after birth. Twenty-five per cent of blindness is from this cause. A large percentage of young girls [1 month to 10 years old] are infected [innocently, so far as they are concerned] by this coccus. The remedy is: (1) birth registration; (2) routine washing of the eyes of the newly born with silver solution; (3) reporting of venereal disease like other forms of contagion; (4) education of the public as to the harm of venereal diseases; (5) the control of prostitution along the lines recommended by the Chicago Vice Commission.

Eye Drops for Baby.—*S. C. writes: "In one of your articles last summer I noticed that you prescribed a boric acid solution and nitrate of silver for treatment of a baby's eyes at time of birth. Will you please give directions as to just how to use this treatment, how strong the solution of boric acid should be, etc.?"*

REPLY.—Drop one drop of silver nitrate solution into each eye. Follow immediately with a drop of salt solution. Do not use the same dropper for the two solutions. This procedure is to be carried out within two hours after birth. After that, if the eyes need cleaning, use a boric acid solution. Drop this from a piece of cotton held close to the eye. Use fresh cotton or cloths for each eye. Strength of solution—Nitrate of silver in distilled water, 2 per cent (solution must be fresh); salt solution—table salt in boiled tap water, 1 to 2 per cent; a level teaspoonful of boric acid to a quart of boiled tap water. Many boards of health now furnish eye drops ready to use.

To Prevent Blindness.—*J. T. wants to know what solution should be dropped into the eyes of a newly born babe to prevent it from going blind.*

REPLY.—As soon as the baby is born it should be cleaned. Use separate cloths, or cotton, for the head. Clean the eyes with fresh sterile gauze. Do not clean one eye with a piece that has touched the other eye. Separate the lids and drop one drop of a 2 per cent solution of silver nitrate in each eye. See that the eyes are cleaned each day with a saturated solution of boracic acid and clean sterilized gauze.

May Need Glasses.—*A. B. writes: "Will you kindly describe the condition known as retinal hemorrhage? Do the eyes discharge blood? My eyes are often bloodshot, with the lids slightly inflamed, especially in the morning. At such times they are quite sensitive, but there is no discharge of water or pus. There is sometimes pain over or in the eyes; otherwise I am free from headache. The sight is not impaired. What causes this condition?"*

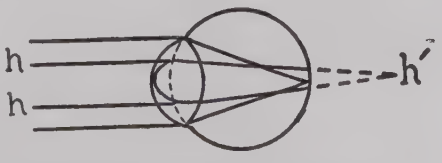


FIG. 68.—SIMPLE HYPEROPIC ASTIGMATISM.

REPLY.—1. The retina is in the back of the eyeball. It is the part of the eye in which are located the delicate nerves of sight. The front of the eye is a mechanical apparatus for the purpose of properly throwing the light on the retina. The blood vessels in the retina are delicate. If

one of these small vessels breaks, a little blood pours into the retina, making a hemorrhagic speck. The speck can only be seen with a special instrument. It usually consists of a drop of blood, or less. The eyes do not bleed.

2. A thorough examination would probably show that you need glasses.

Bloodshot Eyes.—*L. H. S. writes: "What causes bloodshot eyes and a burning sensation in those organs? What would you suggest as a remedy? Would glasses give relief?"*

Reply.—Bloodshot eyes and a burning sensation in the eyes are symptoms. They mean need of glasses more frequently than anything else. When your eyes are properly examined for glasses the oculist will find any other cause if any is there.

Tears Symptom of Closed Ducts.—*Sheldon writes: "About a month ago I took cold sleeping in a draft. I felt at once that it had settled in my left eye, as it became watery and gave me a great deal of trouble. My doctor thinks the tear duct is closed and insists that it should be operated upon. It troubles me most in the open air. What are the symptoms of closed ducts?"*

Reply.—The tears overflow. In most cases the operation is simple, consisting of repeated passing of a probe.

Glasses for Astigmatism.—*L. M. B. writes: "Will you kindly inform the writer if there is any cure for astigmatism of the eyes?"*

Reply.—Glasses that fit will cure the defect in vision. An astigmatic eye is one shaped somewhat differently from a normal eye.

Operation for Cataracts.—*S. A. writes: "My mother is 65 years old. She has somewhat recovered from general illness, caused by hardening of the arteries, and, though she is better, she complains of rheumatic pains and a numbness of the limbs and stomach. Is there any help for this condition? She also has cataracts on her eyes, and in one is about totally blind. Should she have it operated upon now or wait till she is stronger? Would the operation be done successfully at the state eye and ear infirmary on Adams Street, Chicago?"*

Reply.—1. Have her keep her teeth clean. If she has any sore throat, have her physician see that that is cleared up. Keep her in the open air; have her take exercise. Massage will help. Have her eat enough meat to build her up.

2. Have her wait until she is in good physical condition. Cataracts commonly are allowed to harden, or ripen, before they are removed. It is not an operation that one need be in a hurry about.

3. Yes.

Failing Sight.—*Paxton writes: "I know a man whose sight is failing, though he is not 50 years old. He has chewed tobacco and been a drinker to some extent, had led a bad life and had a vile disease several times. Is this disease responsible for the condition of his eyes and do you think he can be cured? Glasses do him no good."*

Reply.—I guess the "vile disease which he has had several times" is the one which does not cause blindness in the way described by your letter. That one causes the eyeballs to suppurate and ulcerate, and blindness to

come in a few days. The vile disease that sometimes causes blindness to develop slowly is not a disease that one "has several times." Tobacco not infrequently causes the sight to fail. It produces a paralysis and, finally, an atrophy of the main nerve of the eye—the seeing nerve. My advice to him is to see a good eye specialist. If his eyeball is getting senile—and he is just at the right age for that—proper glasses will fix him up. If it is tobacco amblyopia, he should get better if he quits chewing. Whisky makes no difference except that it makes his eyes old before their time.

Tears Best Eyewash.—*E. R. writes: "What is better than boric acid water to strengthen the eyes? Which is the better to take the first thing in the morning, hot or cold water?"*

REPLY.—1. No sort of eyewash will strengthen your eyes. Eyewashes only wash the outer coat, or conjunctiva. At that the tears, a weak solution of salt, are better than any man-made eyewash. The structures that are of consequence are deep in the eye beyond the reach of washes.

2. Either is good. Perhaps cold is better.

Cataract "Ad." Untrue.—*H. F. A. writes: "A doctor advertises that he can cure cataracts by what he calls a dissolvent treatment. Is this possible without injury to the eye itself?"*

REPLY.—No.

Treatment of Styes.—*R. J. G. writes: "Please tell me the cause of and cure for styes. My daughter, about 6, and myself, 37, are bothered frequently in this way. Do they denote weakness of any kind?"*

REPLY.—Styes are caused by infection of the edge of the lid with pus cocci. Some disturbance in the general health or some error of refraction may be the predisposing cause. In the early stages the eyelash which runs through it should be pulled out and an application of strong carbolic acid or tincture of iodin made to the diseased area. If this fails to effect a cure it may be necessary to have it lanced to let out any pus which may have accumulated. Warm applications or hot stupes are then made to relieve the pain and hasten suppuration. An application of mercurial ointment rubbed over the diseased part promotes recovery and has a tendency to prevent recurrence of the disease. Usually it is wise to have your family doctor or an oculist treat the disease, especially where there is a tendency to recur. Where the stye occurs as a result of a lowered state of health efforts at correction are to be made by giving suitable tonics. Where it results from errors of refraction suitable glasses are to be used.

Infection Causes Stye.—*Mrs. F. wants to know the cause of stye on the eye. Also, whether it is, as a great many people declare, helpful. Last week she had a small stye on the lower lid. Now one is coming on the upper lid.*

REPLY.—A stye is due to an infection of the root of an eyelash or of an eyelid gland by a pus coccus. It is not different from a small boil. It is not helpful in any sense. Eye-strain contributes to it indirectly; unclean lashes and lashes which should be removed are another factor.

Oculists are like other people—some honest, some not. They average better than the run of men.

You must exercise care in selecting your oculist as you do in selecting

your milkman, grocer, or husband. If you need glasses you should wear them.

Strained Eyes.—*Mrs. M. M. writes: "I am 34 years old and am having trouble with my eyes for the first time. I am cooking on an oil stove. The room is small and is heated by an oil stove. I cook two meals each day by oil lamp, making six burners lighted at one time. I am poor and do washing every day. Two children depend on me. Do you think the kerosene is the cause of my trouble?"*

Reply.—Six burners would use up a lot of air and pour a lot of carbonic acid into the room. Unless you ventilate well this would be trying on your general health. It would not hurt your eyes especially, however. If the light is poor and you strain your eyes you may be harming them. Your age is about right for the development of senile changes in the eye, principally long-sightedness. See if glasses will not relieve you.

CHAPTER XI

The Ears

AN EARLY SIGN OF DEAFNESS

The ordinary method of hearing is that in which sound waves strike the ear drum and the impulse is transmitted by the bones of the ear to the place where bony movement irritates certain delicate nerves. The irritation of these nerves is carried to the brain, where the impulse is recorded as a sound.

Impulses can be carried to these nerves by bones other than these small bones of the ear drum. In fact, the bones are in touch with each other so that some little sound impulses can travel to the ear from far-away places. We can hear a little with our hands and our feet; we can hear still more with the bones nearer the ear bones.

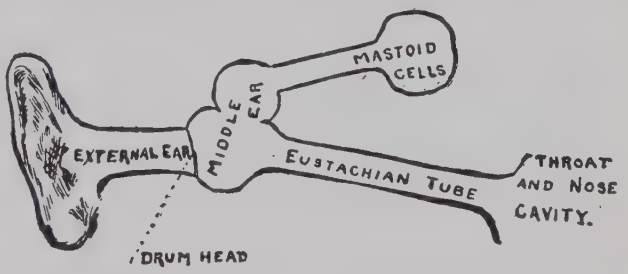


FIG. 69.—SKETCH INDICATING CONNECTIONS BETWEEN EXTERNAL AND MIDDLE EAR, MASTOID CELLS AND THROAT AND NOSE CAVITY.

Bournier offers the following test for the extremely early stages of failing hearing: The foot of a vibrating, deep-toned tuning fork is held against the elbow or wrist. If the hearing is normal, the vibrations are felt, but no sound is heard. If the hearing is beginning to fail, the sound of the vibration will be heard through the bone.

The theory is that when the ear drum begins to thicken up and ear drum hearing loses some of its acuteness, the indirect or bone hearing becomes somewhat more acute to compensate; that when this test shows bone hearing to be more delicate than normal, it is a sign that ordinary hearing is going away a little.

This sign probably would not hold good for the deafness of old age. Its field is those who, by reasons of neglected earaches in childhood, or by reason of thickening of the drum, or other changes in the middle ear, are getting deaf before their time.

The methods of testing the hearing are simple. There are elaborate devices and expert examiners, but no one need wait for either of these. In a perfectly still room, ascertain if the watch tick can be heard at two feet, or a whisper at eighteen feet. Try each ear with the other closed. Learn if a tuning fork held an inch from the ear can be heard for eighty seconds.

These are simple tests and can be made without much apparatus. They are not exact but they give one a fair idea as to whether his ears are losing accuracy. If he remembers, or if he learns, that, as a child, he had many earaches or many attacks of sore throat, or was a mouth breather, it is advisable for him to take stock of his ears at his annual inventory.

If the man is of a deaf family, it is also well to take stock. Deafmutism is hereditary. The laws of its inheritance are pretty well worked out.

Deafness developing in middle life also runs in families. The reason for that has also been worked out. It is because certain families have more earaches in childhood and certain of these families are disposed to neglect the earaches of their children.

EARACHE

Deafness belongs in that group of conditions in which interest is so rapidly awakening—the conditions which produce inefficiency. Dr. Alexander Graham Bell is behind the Volta bureau for the increase and diffusion of knowledge relating to the deaf and its monthly publication, the *Volta Review*.

In this bureau there is a card catalogue relating to 4,471 marriages of deaf mutes. Analytical study of these shows that as to 2,642 sufficient data are in hand to make the information on the card of value for study. Of these 2,342 marriages resulted in hearing offspring. In 300 some of the children could hear and some were deaf mutes.

Studies of people who become hard of hearing in middle life show that this condition has a little disposition to run in families.

We grow deaf because of infections of the middle ear. The infection travels to the middle ear from the nose. When bacteria and the poisons of bacteria are absorbed by the lining of the nose they are carried to the adenoid, or pharyngeal tonsil, and to the eustachian tonsil.

The first of these is near the duct to the ear and the second is near it. For this and other reasons many colds end in earache.

Certain families are more subject to colds than others. This is partly because of inherited susceptibility and partly because of the habits of the family. Certain families are more subject to earaches as a result of colds than others.

The customary way of treating an earache is to pour some oil into the external canal. As this does no good we may say that the customary way of treating earache is to do nothing for it but to wait for nature to cure it. This nature does satisfactorily, so far as the immediate result is concerned. But the ear is a delicate organ. It cannot be slammed around promiscuously and repeatedly without being harmed.

These earaches leave a little thickening behind. When to this thickening the changes of age are added the party grows deaf. Absolutely to lose the hearing from this cause is unusual. We speak of it as "getting hard of hearing." As was said a while ago, this condition runs in families.

Nobody can afford to neglect earaches. In spite of this people will continue to pour in some oil or laudanum, and let it go at that.

Some people can afford it better than others. If a man belongs to one of those families wherein they get hard of hearing at about 50 years of age

he can be certain that he cannot afford the earache, however safe it may be for others.

REËDUCATION OF HEARING

A large number of people are partly incapacitated by poor hearing. "As soon as one does not hear the human voice well, he does not hear any longer, because it tires him to listen; he isolates himself as far as his hearing is concerned until he relapses into a deafness more and more complete."

This condition parallels that of the rheumatic cripple who quits trying.

Some day parents will watch their children's earaches so well that this procession of people hard of hearing at 50 because of earache at 10 will stop. But, for the present, we have to deal with their forty-year-after deafnesses.

When I go into the workroom of Dr. McMillan of the Board of Education I find instruments for testing the acuteness of hearing, just as I see other means of testing the acuteness of vision.

Dr. Maurice of France has devised an instrument for reëducating the hearing. This he describes in the *Annals for Nose, Throat, and Ear Diseases.* He does not get much help from massaging the drum of the ear with a little air pump, because he says it vibrates the drum at low speed, while in hearing the sounds vibrate the drum at high speed.

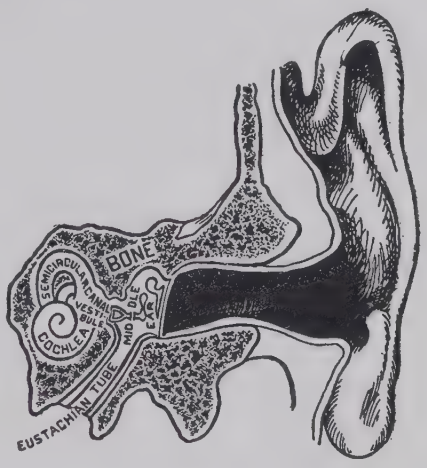


Fig. 70.—Section of Left Ear and a Portion of the Skull Showing External Canal Ear Drum, Middle Canal Ear Drum, Middle and Internal Ear and Tube to Nose and Throat.

The instrument invented by Dr. Maurice is called the kniesiphone. There are several other devices in use for the same purpose. Instruments of this type are to be used under medical direction.

The patient himself can do a good deal in the way of reëducating his hearing. Listening to sounds is of service. Talking machines can be made use of.

I think I can see where a thinking person could devise a method of self-help making use of a dictaphone. The telephone can be made use of. There is an advantage in using those instruments, such as a telephone ear piece, dictaphone tips, or a stethoscope, instruments in which the impulse is transmitted to the ear drum by a column of air.

WHAT THE MOTHER OF A DEAF CHILD OUGHT TO KNOW

In the first place, she ought to know that to meet the situation honestly is the only policy that means efficiency and happiness for her child. The

ostrich head-in-the-sand policy is selfish. It is a *mañana* policy, and, like all *mañana* policies, it costs more than it comes to.

In the next place, she should know that she should begin to teach her child to read lip movements soon after it has passed its first birthday.

Some time ago a mother wrote me that she had been delaying the instruction of her child because she had heard that speech deficiencies work themselves out, that the power of speech came around in time.

Not only does delay make teaching more difficult, but there is the added danger that the child may have acquired social habits that it will be difficult to break.

In his book on the subject Wright advises, first, that a careful examination of the ears and speech organs, sight, and mental state be made by a competent physician; then, that instruction be begun when the child is about 15 months of age.

The next step in instruction is to talk to the baby in clear, distinct tones, without exaggeration of lip movement or facial expression. The mother should watch the baby's eyes; she should speak to him only when she has his attention. The meaning of words, sentences, commands, and entreaties should be taught by association, as in the case of children who hear.

Until the child is about three years old no effort should be made to teach him to talk. I am writing now about wholly deaf children. Miss Torrey says in the *Volta Review* that even the slightly deaf should be taught lip reading. The education in speech of a slightly deaf child should begin at the usual time for teaching babies to talk.

During the first three years of the life of a deaf child it is enough to teach him to read the lips, to train his mind, to inculcate companionship and social instincts, and to develop the body.

Speech should be taught even to the wholly deaf and the children of low intelligence. The best authorities are agreed that these children should be taught to talk with the vocal organs and not, even in part, with the fingers.

Wright holds that if the mother is intelligent and the home is good the child should not go to school until he is at least 5 years old. After that age the child will learn faster in school than at home.

Some don'ts given by Wright are:

Do not consider the deaf child as different from other children.

Do not cease talking to him.

Do not speak to him with exaggerated facial movements.

Do not exempt him from the duties, tasks, and obedience properly demanded of all children.

Do not let him grow selfish.

Do not let him grow indifferent.

Do not be in haste.

Do not show impatience.

LIP READING

A very large number of people have a tendency to become hard of hearing as they pass middle life. A fair proportion of these a few years later are more than hard of hearing; they are deaf.

The largest element in causing this infirmity is infection of the nose, throat, or ear in early life. Deafness developing in middle life runs in families, partly as a matter of inheritance and partly because it is the custom in certain families to neglect earaches and colds.

Some of the hard of hearing settle down into a dull insularity—keeping away from people, avoiding lectures, missing church, reading, sewing, or knitting all day long—oversensitive. Some undertake to keep in the current by using trumpets and hearing accessories of one sort or another. Some try to get along by having those around them talk in a loud tone or with mouth to ear.

Miss Torrey thinks that the way to avoid all this is to learn lip reading. She says lip reading ought to be considered the first resort of even the slightly deaf, if the case is beyond medical relief. A reputation for being deaf causes people to avoid deaf people or to dread trying to talk with them, or to talk to them in a loud voice, or in a manner otherwise unnatural.

To avoid this she advises that those in whom deafness is coming on learn lip reading as soon as incurable deafness is diagnosed. A good method of beginning is by the study of some book, such as Miss Yale's "Formation and Development of English Elementary Sounds."

The *Volta Review* contains a wonderful story by Mrs. Jelks. Her little girl at two years of age had an attack of scarlet fever which left her entirely without hearing and with no capacity for spoken speech.

The mother has trained her to speak perfectly. She can interpret the spoken words of children around her. In school, in play, in the walks of her young life, she is a part of the life around her. She began lip reading and speaking with a study of Miss Yale's book.

In beginning it is advisable to spend some time before a mirror studying the position of the mouth when uttering different words.

There are two principal systems of lip reading, the Mullerwalle and the Nitchie. As Mr. Nitchie says, these are teaching methods; the student must pay special attention to the practical; that is, actually to make the sound and note the positions of the vocal organs.

"It is always difficult for a deaf man or woman to find a position. Why not read the lips before deafness becomes so noticeable that the work is affected? The results of the training, in alertness, absolute concentration, and quickness of perception, become an asset which is valuable in any line of work."

Perforated Ear Drum.—*C. W. L. writes: "I am 21 years old and since I can remember have been unable to hear with my right ear. When a child I was troubled with earache. Upon consulting a physician I was advised that there was a hole in the ear drum and that nothing could be done for it. Would a patent ear drum restore my hearing in this ear?"*

Reply.—Evidently when you were a child an infection spread from your nose to your ear and pus discharged through the drum. The cause is plain. The ear drum cannot be restored, but you will be able to find an apparatus which will improve your hearing. Try those offered for sale until you find the one which gives you the best results. Be careful not to buy without a guarantee and do not buy one that does not give results after several days' trial.

Cotton in Ears Harmless.—*J. K. writes: "Some time ago I asked you if cotton put in the ears at night to shut out the noise was injurious to the ears if the habit was kept up continually, and you have not replied. Will you please do so?"*

REPLY.—It will not harm you to put cotton in your ears before retiring.

Your Physician Will Determine.—*H. E. K. writes: "Our little girl of seven years has been troubled with earache, and upon examination we find that adenoids are just coming. Are they the cause of the earache, and should they be removed at once? One ear has been lanced. Is it the safest to operate on the ear?"*

REPLY.—Suppuration of the middle ear as shown by earache and suppuration means infection extending from the tonsils or adenoids. The focus of infection must be cleaned up. Your physician will determine if operation on the ear is also needed.

Remedy for Earache.—*L. W. H. writes: "Kindly advise a remedy for earache of a child five years old, who is bothered at times with tonsillitis."*

REPLY.—A hot salt bag to the ear is better than medicine dropped in the ear. But why not go after the real trouble—the tonsillitis?

Approach of Deafness.—*M. W. writes: "What measures can be taken at home to ward off the inroads of deafness in approaching age?"*

REPLY.—Something can be accomplished by removal of any contributing causes in the nose, throat, or ear. However, results are generally unsatisfactory. The trouble is that deafness after middle age is usually due to neglected throats in youth and that puts help out of reach.

See Ear Specialist.—*Miss B. writes: "By what means can a girl of 26 be relieved of head noises? They have lasted for four years, and at times become perfectly maddening. I had hardened ear wax and adenoids removed three years ago, so there are no obstructions. Inflating the ears gave no relief."*

REPLY.—There are many causes of head noises and the cure of a given case depends on the cause. Although you have had more than one search for the cause in your case, it has not been found, and you should continue your search. See the best ear specialist available.

Partial Deafness Hereditary.—*I. C. C. writes: "Is partial deafness ever hereditary? In a family of ten children three were slightly hard of hearing from no apparent cause. The mother of this family was the same way. One of the girls is about to be married. Do you think her children will have the same trouble?"*

REPLY.—1. Yes.

2. Some of them will. This subject is well covered in Bell's "Study of the Inheritance of Deafness."

Running of the Ear.—*D. E. A. writes: "Is there a cure for running of the ear without an operation? Is there anything that could be done at home to cure? Does it affect the eyes?"*

REPLY.—Running of the ears sometimes stops of itself. To keep the ears clean will help. However, one is not justified in neglecting running

ears, even when the running stops spontaneously. The condition is generally the result of infection which has spread from the throat to the ears. It is the usual cause of deafness. The way to prevent deafness is properly to cure these infections. When, ten years later, deafness is discovered nothing can be done.

To Prevent Deafness.—*Monmouth wants to know whether coffee causes deafness. Does catarrh cause it? What will relieve severe headaches?*

Reply.—1. No.

2. Infections which spread from the nose to the ear thicken the ear drum and cause deafness. To prevent deafness one must take care of the nose and throat.

3. There are many kinds of headaches. Follow your physician's instructions to get rid of them.

Ménière's Disease.—*M. E. V. writes: "What is Ménière's disease? Is it incurable? Is it dangerous to follow one's vocation if suffering from this disease? Is it possible to help oneself by fasting, etc? Does this disease cause throbbing in the ears?"*

Reply.—1. Ménière's disease is a disease of the semicircular canals—a part of the internal ear. These canals have to do with maintaining the body in a steady equilibrium. When the canals are diseased there is dizziness and a disposition to fall.

2. (a) Some cases are incurable, others are curable; others show a tendency to remain at a standstill. (b) Depends on the person and his work.

3. Yes. Even in those cases in which cure is not possible, one can gain much by readjustment. Sometimes diet helps. A milk diet benefits some cases.

4. There are different causes of throbbing. Ménière's disease is one of them.

Lip Reading.—*R. writes: "Please let the deaf know of the advantages of lip reading. If persons who are losing their hearing would start to learn lip reading promptly they would be gainers. I have been taking lessons for about four months and am able to understand members of my family and many outsiders without hearing their voices. I am gradually learning to forget my defect, and human intercourse is becoming more a pleasure than a torture. The Volta Bureau, Washington, D. C., will furnish names of teachers of lip reading. Some of the public schools have evening classes in lip reading."*

Ringing in the Ears.—*P. E. G. writes: "What causes and what is the best remedy for the singing, roaring sounds in the ears of so many Chicago people? I am asked so often to talk a little louder. I know people who have paid large sums of money to specialists, with no good results. Would mullein oil, Haarlem oil, or any of the oils be of benefit, or warm water forced in with a few drops of glycerin?"*

Reply.—The ringing in the ears and the deafness which develop in middle age are the results of the neglect of throats and noses in youth. Generally nothing can be done and those inconvenienced go from specialist to specialist, trying to get some help. Haarlem oil, mullein oil, and remedies of that type will do no good at all. Occasionally a sufferer will find

some relief from surgical or mechanical procedure, but the best the average person can do is to content himself as best he can, resolving that he will not allow his children to suffer from the same neglect.

The next generation will have much less deafness than ours, even though the dinning of continued noises is making hearing generally less acute.

CHAPTER XII

Rheumatism

Rheumatism is a term frequently used to cover almost every kind of ache or pain. The disposition among medical men now is to limit its use rather sharply to inflammatory rheumatism.

Inflammatory rheumatism is an inflammation of a joint accompanied by fever and general aching. These inflammations are due to infection of the joint by bacteria which have got into the body at some distant point, have found their way into the blood, and have been thrown out of that fluid into a joint.

Some of these rheumatisms, so-called, are due to venereal disease bacteria, others to the germs of the pneumonia group. Most cases of acute inflammatory rheumatism are due to germs—sometimes one kind, sometimes another—which get into the blood through the throat.

In its relation to old age the principal interest in rheumatism lies in its effect upon the heart. When the germs are traveling from the throat to the joint they pass through the heart. Some stop. Acute heart disease, in the course of rheumatism, is always dreaded, but it is more important to know that a heart can be crippled by rheumatism and not show it until months and sometimes years have passed.

There is a group of joint affections akin to rheumatism, yet very different, called rheumatoid arthritis, or arthritis deformans. To illustrate: A woman about 50 years of age notices her fingers are becoming crooked and the bones larger at the joints. Perhaps she notices that the skin over the joint is tense and shiny. Without causing much pain, her disease progresses until her hands are badly deformed. This is a type of rheumatoid arthritis which is easily told from rheumatism.

From this type the disease merges into another—one which causes pain and at times fever. Much oftener than the other type it begins in younger people. Having begun, it progresses until the joints are twisted, gnarled, deformed, and locked.

Whether the sufferer be in the one group or in the other, somewhere in the body, and usually in the nose or mouth, there will be found a focus of mild—very mild—infection. Nearly always it is in or around the teeth. It may be in decayed teeth, but more frequently it is in the gums—the usual cause is pyorrhea.

Lambert states that in 172 cases where special search was made for an infection focus 141 had badly decayed teeth or the teeth had dropped out.

The man with rheumatism should have his mouth, throat, and nose examined to locate the focus of his trouble.

The man with beginning rheumatoid arthritis should seek the focus of trouble in his teeth and gums.

Most of the people who have aches and pains are not rheumatic; they are gouty. Among the gouty aches Paget puts muscle pains, lumbago, sciatica, neuritis, some headaches and neuralgia.

To these Dyce Duckworth adds such maladies as deep-seated pains in the bones and spine, obstinate patches on the skin, and inability to digest richly cooked foods. There is an inflammatory joint type of gout—rich man's gout, if you please—but the cases are few.

Our especial interest is in the forms of atypical gout so much in evidence in the spring, the gouty aches and pains which make people call for spring medicines—blood purifiers.

Just as the true rheumatic is the field from which most of the heart disease is recruited, the gouty is that from which arteriosclerosis (hardening of the arteries), high blood pressure, apoplexy and chronic Bright's disease draw their subjects.

While we sympathize with the inconvenience of lumbago and other gouty aches, gout as a cause of apoplexy, paralysis, and Bright's disease is of much more importance.

Living to avoid gouty aches and pains is so simple! Its simplicity makes it difficult, because the doing of simple things does not accomplish results unless there is persistence—and persistence is a rare virtue.

What is simpler than to eat no more than you can burn up by exercise and work, and to exercise and work enough to burn up all that you eat?

What is simpler than to follow the example of the fireman who puts on more coal than the fire can burn? He knows that he will partially smother the fire, get too much ashes, and make black smoke. What does he do about it? He shakes down the fire, gets rid of the ashes, and opens the drafts so as to feed more air.

The man who has a gouty headache takes a purgative and walks two miles. Up to this point he follows the example of the fireman. But a good fireman does not habitually overstoke or neglect the draft. And there is where his example is not followed. The gouty subject, feeling better again, eats out of balance, exercises but little, and breathes foul, warm, dry air.

FORMS OF RHEUMATISM

The acute inflammations of the joints with swelling and fever are called acute rheumatism. These are due to infection of the joint or joints with any one of several germs. Some of these germs are violent in their local effects, some are violent in their general poisoning, but not destructive locally; others are mild both generally and locally.

Therefore, no two cases of rheumatism can be judged by the same standard. Those who suffer from this kind of so-called rheumatism should:

1. Secure proper treatment for the general and local symptoms.
2. Discover the type of infecting germ causing this particular attack.
3. Discover the point where the infection is getting into the tissues, whence it is carried to the joints.
4. Remember that rheumatism of this type is largely responsible for the heart disease of later years.

5. Eat lightly during the attacks, eat well between them. Red meats are of much service between attacks.

What is called chronic rheumatism is another group into which a dozen different diseases are commonly thrown. Some of them are nerve diseases, some are infections, some are the effects of senility. They are caused by a dozen different causes, and what is good for one harms another. A good illustration is that chronic deforming change in joints called deforming arthritis, which leaves them twisted, gnarled, and stiff.

Some of these cases are due to infections through the tonsils or elsewhere; some are due to nerve disease.

To cut these people off from meat, to send them around to baths and cures, is just as foolish as anything can be. In this group called chronic rheumatism there is need for analysis. Some are helped by baths, others not; some need more food, some less.

In between these comes a great medley of pains in joints, muscles, and nerves that people loosely call rheumatism. They are milder than the fever kind of rheumatism. Some of these are mild infections. A good illustration is the growing pains in children, usually due to mild infections.

The proper treatment of this group is to find and clean up the point where the infection is getting in.

The largest part of the cases usually called rheumatism and belonging to this class are really gout. These cases are suffering from bad habits. The quantity of food which they eat is too large, or it contains too much proteid, especially meat; or they are constipated, or they are not good heat makers, or some part of their body is susceptible to chilling, or several or all of these combined. These are the people who are benefited by baths, by cures, by diets, by massage, by flannel binders, and the like.

Such measures relieve symptoms in a satisfactory fashion. Sufferers do not get permanent relief until they eat less food, eat less meat, exercise more, retrain the susceptible parts of their bodies by local cold baths. The man who does not go deeper into his condition than to call it rheumatism will waste a lot of time and may do himself a good deal of harm.

No form of so-called "rheumatism" should be allowed to run. It may lead to bad consequences. The bad habits of the gouty forms should be corrected and kept corrected. There must be no "falling from grace." The infection forms must have their causes removed. We are greatly at sea when it comes to the nerve forms.

Why not quit talking about rheumatism as though it were one disease? Why not speak of a case as an acute, subacute, or chronic infection of a joint, or the joint change in a certain nerve disease, or a painful gout of a certain muscle, nerve, or joint?

"FULL OF RHEUMATISM"

Old people are generally "full of rheumatism." What "full of rheumatism" means, scientists are not agreed on. In fact, probably half a dozen pathologic conditions are thrown together in the condition called "full of rheumatism." There is acute inflammatory rheumatism, gout, rheumatoid

arthritis, Heberden's nodes, Dupuytren's contraction, Marie's fingers, senile arthropathy, muscular rheumatism and neuritis.

The sufferer may have any one of several things in mind. He may refer to the knobs around the joints and the crooks in his fingers. He may refer to periodical attacks of inflammatory rheumatism. He may have in mind a persisting soreness in his joints with creaking. He may refer to a general muscular stiffness with a marked tendency to develop soreness and pain upon slight exposure to changes of temperature or out of the ordinary exertion.

The acute inflammations need one treatment. The remainder of the group needs another. Attacks of acute inflammatory rheumatism become less frequent as men become old.

The reason is plain. Old men are less liable to infections than young ones, and we now know that acute inflammatory rheumatisms are due to infection. The infection is usually through the throat or nose.

Old people who are "full of rheumatism" should throw away their pocket pieces—their buckeyes and potatoes—and have their tonsils, gums and upper breathing apparatus put in good order and thus maintained. Saundby says:

"If elderly patients follow the rules of hygiene, temperance in diet and regular exercise, they will suffer little, if at all, from goutiness and its various manifestations."

If you were to ask a dozen doctors which of the symptoms that make up a "full of rheumatism" group are due to gout and which to other causes, you would get close to a dozen answers. Then let us broaden Saundby's statement so as to make it: If elderly patients follow the rules of hygiene, temperance in diet and regular exercise, they will suffer little.

As it is, elderly people suffer much. What are, then, some of the policies to follow?

To go to the baths once or twice a year, when feasible.

To take massage, exercises and osteopathy from time to time.

To spend some time every day "suppling" the muscles and joints.

To wear plenty of warm clothes.

To get some fresh air every day.

To eat good plain food, but with discretion and moderation.

While some meat may be best for them, the quantity should be much less than taken by younger people. Meats should not be highly tasty. Meat broths and meat teas should be avoided.

Just that part of the meat which is cooked out of beef and into the broth in boiling is harmful.

GROWING PAINS

Some time ago, while I was in a drug store in Rochelle, Illinois, "killing time" between trains, a woman came in. She had two children tagging along. She called for a fifty-cent bottle of rheumatism cure. She said she had found it fine for growing pains. Her children were accustomed to much drugging and looked the part. They were typical, spindling, pale medicine takers. It was not necessary to listen to the woman or to see the purchase to know that.

The mother paid her half-dollar and went on her way with her bottle of sure cure for growing pains. Had she gone into her yard and thrown a half-

dollar at a post she would have missed the post and lost her half-dollar. That is just what she did in the drug store. *What she had got had not cost the producer a tenth of a dollar and it was worse than useless to the child who took it—so she lost her half-dollar. She also missed the post, and that is what counts most.*

She had been relying upon medicine to cure rheumatism in her children. They did not have rheumatism. *"Growing" pains are not growing pains. The woman had learned that much. She had taken one step. Neither are growing pains rheumatism. They are infections.* The infection finds entrance through the mouth. The mother had not taken that step. She had heard enough to get by the growing-pain stage, but she had stopped there.

Nature had partly cured her children. The mother was satisfied with the cure and told the druggist so. She did not tell the druggist that such curing as was done had been accomplished by nature. She had not found that out. She had not even learned that cure of rheumatic pains in children is a poor makeshift; that children properly cared for would be prevented from having pains. She had wasted her 50 cents, but, far worse than that, she had missed the post.

Those children should have had their tonsils and adenoids put in order. They should have been living the laws of hygiene. She was not thinking much about right living for her youngsters, because her limited experience told her that fifty cents' worth of medicine would ease the growing pains. Filling their stomachs with medicine, she was bringing up a pair of pasty, flabby youngsters trained to run to the medicine cabinet.

We have well developed, active, and efficient departments of public hygiene. Thinking people know these to be the best agencies used by government for the promotion of social efficiency. There is no organized agency for the promotion of personal hygiene. Such effort as there is is individual and sporadic. In consequence, the yellow wrapper and the lurid picture still hold the field. In consequence, mothers are still throwing half-dollars at posts and children are growing up pasty, spindle-shanked, and perpetually dope-hungry.

ARTHRITIS GERM INFECTION

It is now generally agreed that many of the so-called "rheumatisms" are caused by germs. The proof as to ordinary inflammatory rheumatism has been accumulating for a long time. In the last few years the proof as to rheumatoid arthritis has been piling up.

In the *Journal of the American Medical Association* Dr. Billings says that his opinion is that the deforming joint changes usually found in middle-aged people and known as rheumatoid arthritis are due to infection with a germ. The germ usually gets into the blood through the mouth or tonsils or nose. It sometimes gets in through suppuration elsewhere in the body.

A chronic appendicitis, or an old pus tube, or an infected gall-bladder can cause it, as well as can catarrh and pyorrhea, bad teeth, and foul tonsils. It can be caused by an old gonococcal infection of the prostate gland and certain tubes running through it.

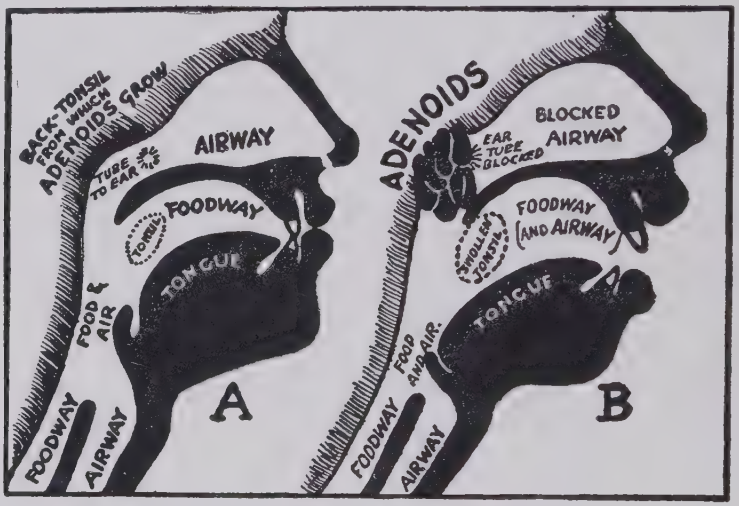
This being true, the person developing rheumatoid arthritis, instead of

searching for some springs to go to, should search for the old spring within him, the spring of pus hidden away in some pocket in his insides and pouring germs into his blood.

This spring, being found, should be cleaned up whenever possible. Most of the cleaning up will have to be surgical. The teeth, tonsils, nose pus sac, or offending tissue, wherever it is, should be made clean or else removed.

Using vaccines made from the germs found present, Dr. Billings has discovered, helps some. Then follows an important point. Good food, sunshine, fresh air, massage, and rest can do a great deal to increase the capacity and to decrease the suffering of the person with deformed joints.

The custom has been for the person with a developing arthritis to ruin



Chicago Health Department.

FIG. 71.—CROSS SECTION (A) OF THE HEAD OF A NORMAL CHILD AND (B) OF ONE WHOSE TONSILS AND ADENOIDS HAVE ENLARGED SO AS TO BLOCK THE NASAL AIR PASSAGE, THEREBY MAKING A MOUTH BREATHER OF HIM (B).

his digestion with salicylates and iodids; to ruin his vitality by strict dieting, abstaining from meat and other nutritious food; to ruin his pocketbook running around to springs, and finally to lose confidence in everybody and everything, to come to the conclusion that he has an incurable disease, and then to lapse into helpless, hopeless invalidism.

To drain the pus sacs and to clean up the dirty areas is the proper treatment for those who are in the earlier stages. It is well for the other group to know that it does not follow that its members should become helpless merely because they cannot be cured.

It is well for the doctor to get the idea in his head that people with incurable diseases are doubly in need of help; and arthritis patients, living hygienic lives and properly directed, will gain greatly in efficiency, as well as in comfort.

PEOPLE WITH STIFF LEGS

Any injury to, or infection of, a joint is liable to leave the joint stiff. The everyday man is still wrestling with the question: Which came first, the

hen or the egg. When the cynic would floor the bacteriologist for the count he asks: "Whence came the first bacillus?"

These busy little debaters have nothing on the anatomists who try to answer the question: Which came first, the muscles to move the joints or the joints to be moved by the muscles?

On this question, among anatomists, there are two hostile camps. But whichever came first, they both agree that, with all the ordinary joints, *unless movement is kept up the joints will grow stiff.* The ends of the adjacent bones will be bound immovably together.

The tissues that make up the joints are low grade tissues. They have little power to resist germs. When germs are floating around in the blood the liver will pick up its share and more, and so will the kidneys. But these organs pitch them out instantly.

However, when germs come the way of the joints the poor tissues there have no power to resist. Some form of infection results. Among these infections are some that are commonly termed rheumatism.

The low grade tissue of a joint, when inflamed, can do but one thing, and that is to pour out a sticky fluid. This fluid is about the same as the fluid which binds together the two sides of a cut.

If the inflamed joint is neglected, this fluid glues the ends of the bones together. As time goes on, the union becomes stronger.

At first, to limber up the joint causes some pain, but it can be accomplished. After a while the adhesions are so strong that operation is required to break them up.

Even if movement in a joint is not entirely lost from an attack, it will be noticed that after each attack the range of movement is more limited than before. All of which results from improper personal hygiene.

It is proposed that when the joints are acutely inflamed the ends of the bones shall be kept apart by weights, as in fractures; that, after an attack of rheumatism or other infection of the joints, massage, baths, and exercises be continued until full movement is established—to employ a term used by the Germans, that the cure be completed.

Surgical procedures, though, are always halfway houses. In time, men will know enough to cure cancers without cutting them out and to do things in better ways than by surgical procedures.

The direction of the present-day effort is toward the germs. Some are injecting antiseptic solutions into the joint, some are using vaccines; some are working on antitoxins.

Now that people are losing faith in charms such as buckeyes, are no longer depending on red flannel underwear, are no longer afraid of red meat, are no longer chasing a climate cure, things will look up.

Effort expended on the hygiene of the gates through which rheumatism gets in, while the doctors perfect the method of curing that which has got in, will banish rheumatism.

Another of the rheumatism fetiches that we have chased when we should have known better was the climate cure. Rheumatics are walking interrogation points in their search for a climate that cures rheumatism.

There is none such. The English army is stationed in every portion of the world. Troops drawn from the same stratum of society are scattered from

the tropics to the arctic. Some are at sea level and some at high altitudes. Some are in humid countries and others in the desert.

The daily routine of these groups is pretty much the same, at least, it is much more uniform than is that of the different peoples of the different lands. The rheumatism rate is about the same.

Hirsch, in his geographical pathology, tells us that rheumatism is everywhere that man is. Perhaps there is a little less liability in hot climates; perhaps there is a little less liability in the warm months, but the difference is slight.

There are hot countries where the records show a great deal of rheumatism, and in India and Algeria there is more rheumatism in warm weather than in cold.

The rheumatism rate given by Hirsch among British troops in Canada is 35.9 and in the West Indies, 38.4.

These facts have been known since the Civil War, and yet, because the people generally have not known them, a lot of people have wasted a lot of energy chasing a good rheumatism climate.

However, it seems to me that in what are known as chronic rheumatic conditions, there has been most of loose firing and general waste of gunpowder. The custom is to call almost every persisting pain rheumatism, particularly if it be a leg or arm or a back pain. Likewise almost every ailment of a joint has been and still is called rheumatism.

Hippocrates and the Arabian physicians thought all rheumatisms, aches, pains, joint affections, and catarrhs were the same thing. About 1600 the physicians separated these affections into two groups—rheumatism and catarrhs. About 1800 they divided rheumatism into two groups—one, the acute rheumatic fever; the other, the disorder which twists and gnarls the joint—rheumatoid arthritis.

It was more than one hundred years ago that rheumatoid arthritis was found to be in nowise related to rheumatism. Yet nine people out of ten who have twisting fingers and locking joints think they are rheumatics.

They have been the round of the springs and baths; they have gone without red meat for months; they have tried all the medicines and methods recommended for rheumatism, and it has all been wasted.

A hundred years ago there were those who had found out that rheumatic measures did not help these people. But there have been no popularizers to tell the people about these things and so they have not learned them.

Rheumatoid arthritis probably in time will be divided into two or more diseases. The proper way to handle the rapidly crippling disorder that develops in people usually before middle life will be found quite different from the proper way to handle the slowly progressive disease that starts in old men and women and that enlarges and twists their fingers and toes throughout the remainder of their lives.

The first variety is probably an infection taking place through the gums in many instances, and through some part of the mouth or nose in most instances. The infecting gum is not one of those causing rheumatism. The infection is not even in the joint.

In rheumatoid arthritis the trouble is in the bone. The heads of the bones enlarge, and secondary changes occur in the joints.

In a normal joint everything is arranged in an extremely orderly fashion. Everything has a place and keeps to that place exactly. There is no surplus tissue. Every part is cut to fit.

If there is an excess of fat elsewhere over the joint it dimples down to bone and sinew. The tendons run in nicely adjusted sheaths.

The joints are lined with a smooth membrane. The membrane is arranged as a closed, self-oiling sac.

The ends of the bones grow larger than their shafts and they take just the shapes that best fit them for their functions.

In rheumatoid arthritis there is an exceedingly mild, long continued inflammation in these bone ends. For months nothing is noticed except a little tenderness. Then it is noticed that the joints are getting larger, which means that the bone ends are getting larger.

HYGIENE VERSUS RHEUMATISM

There are many generally held opinions about rheumatism and allied disorders of the joints that do not jibe with the known facts. Some of these popular ideas are not in accord with the facts that have been known for a long time but that the people have not heard about, probably because the doctors would not talk to the people about them and nobody else thought they had any right to do so.

For instance, there is acute inflammatory rheumatism—the kind that makes the joints swell and throws the patient into a fever. Before the present rheumatics were born as good an authority as Hirsch, an author whose books are still standard, wrote:

"Then, years ago, I conjectured that rheumatic fever is a specific, infective disease. . . . Today rheumatic fever has an assured place among the acute infective fevers."

This was written somewhere about 1870. Yet there are rheumatics who have been shunning red meat for these forty years.

Acute rheumatism is an infection. The bacteria causing it may get into the blood stream through almost any part of the body. Some of the organisms that cause it are extremely prone to get in through the tonsils.

However, acute inflammation of the joints may result from different bacteria, just as the lungs may be inflamed from tubercle bacilli or from pneumonia cocci. Some of these are never known to get into the tonsils. For instance, the germs of venereal disease are especially liable to cause rheumatism.

When one is subject to rheumatism, it is advisable to have the tonsils put in order and kept in order, but, with some people, that is not enough. The overhauling must not stop until every gateway for infection has been put in order.

The proper treatment of acute inflammatory rheumatism is on the basis of infection. Salicylates to relieve the pain are all right. They make life more endurable; possibly also they limit the injury done by the infection, but they do not run to the root of the trouble.

Plenty of water to drink and the use of cathartics also serve their purpose. They rid the body of poison and increase resistance.

Some of the best physicians now advocate treating rheumatism surgically. They say that the joint is infected; that the bones of an infected joint will grow together and stiffen the joint unless precautions are taken. Therefore, they put the limb up in a splint. The splint they prefer is one that pulls the ends of the bones apart.

This method not only separates the bones, but it also overcomes the spasmodic pulling of the muscles—the source of much of the pain. After the trouble begins to subside they massage and exercise the joint.

Then it will be noted that the ends of the bone, instead of meeting squarely end to end, come together at an angle. The joint can no longer be made perfectly straight. If it be the index finger, it will be noticed to be crooked at its last joint.

The seat of the trouble lies not in the joint; it is in the end of the bone. As that enlarged, the joint had to shift itself somewhat; the ligaments and tendons were gradually pushed around into new places.

Perhaps after a while the joint became completely locked, but this process was different from the rheumatism process which affects the joint but leaves the bone alone.

So rheumatism has nothing to do with these gnarling chronic processes and when we go after these on a rheumatism basis we gain nothing. On the other hand, we have started on the right track when we quit the wrong track. At last we have made a beginning, and that is something.

Is there anything that can be done for rheumatism? Yes; much can be done in the way of both prevention and cure. Skilled care will bring most men through an attack without any damage to his heart, kidneys or joints, even employing remedies for the relief of symptoms and allowing nature to cure the infection.

In addition, the vaccines for rheumatism have approached perfection closely enough to have found their way into quite general use.

There are many who think the surgical treatment already referred to gives results that are all that can be desired.

Much the more important side of the matter, though, since it concerns more people, is the answer to the question: Can rheumatism be prevented? Again the answer is yes. The person who has proper regard for personal hygiene will lessen the number of attacks of rheumatism and may wholly escape.

The first effort at personal hygiene should be to locate and clean up his focus of infection. It may be his tonsils or his gums. It may be a sinus, opening from his nose.

Hippocrates thought rheumatism and catarrh were identical. In some cases of catarrh there is infection of one or more cavities. The pus drips into the nose and comes to be known as a catarrhal secretion.

The so-called "catarrh" is a chronic infection of this cavity. At times bacteria will absorb from this cavity, circulate for a brief period in the blood, and then locate in some joint and set up a case of rheumatism.

Using the terms rheumatism and catarrh loosely, there was reason for believing the two diseases to be closely akin. The more accurate information of our day brings some conditions called catarrh and some conditions called rheumatism back again to kinship.

In those cases where the gateway of infection cannot be located or, "having been located," cannot be cleaned up, personal hygiene can still help out. If chilling is prevented the organisms may not absorb or, having absorbed, they may not locate in a joint.

The wearing of woolen underwear, of warm footwear, the use of rainproof clothes and shoes—such procedures cause the proper organs to eliminate the bacteria from the blood and prevent them from locating in the joints.

Personal hygiene finds no more promising field than among the rheumatic families. Such need not be perpetually up against it. They can throw away their buckeyes.

Causes of Rheumatism.—*J. J. C. asks what causes rheumatism.*

REPLY.—Acute inflammatory rheumatism, which is, I judge, what you have in mind, is due to an infection. The infection travels to the joint through the blood. It may enter through one of several places, but the usual place where it gets in is the tonsils. A man having acute inflammatory rheumatism should have his throat examined, and then have whatever treatment may be found necessary directed to his throat. Nothing is gained by dieting in this form of rheumatism. Red meats are not harmful. What is called chronic rheumatism is a group of joint diseases. Sometimes what is called chronic rheumatism will be one of these. Sometimes it will be another. Some of these are benefited by change in diet. Some are not.

Rheumatoid Arthritis.—*M. E. W. writes: "What is rheumatoid arthritis? If the blood in the small veins settles in little circles and spots on the legs, between the hips and knees, and back of both knees in spots larger than a silver dollar, causing a stiffness in the legs, what is the probable cause?"*

REPLY.—1. Rheumatoid arthritis is a chronic inflammation of the joints and the tissues around them, resulting from a mild, long continued infection. In its most frequent form it is the condition seen in middle-aged people, especially women, causing the fingers slowly to stiffen and crook. A much more severe form is that which twists the joints and locks them. The infection gets in through the gums and tonsils.

2. The dilation of the small veins under the skin, especially of the legs, is frequently found in women. It is of no consequence; does no harm; does not stiffen the legs, and does not lead to ordinary varicose veins.

Rheumatism and Climate.—*P. P. writes: "Will you kindly answer the following questions: 1. What climate in the United States is best for one afflicted with rheumatism? What climate is worst? Is the rate of rheumatic cases high at and near Chicago? 2. If a person had inflammatory rheumatism during the winter of 1910-11 and had now about recovered from the effects, would he be apt to have another attack this winter? 3. What is the value of 'medicated' woolen underclothing which is recommended by some doctors for rheumatism? What is the best underwear for a person subject to rheumatism to wear? 4. Should a person bothered with rheumatism wear rubbers during the winter months? 5. Should a person who has had two bad attacks of inflammatory rheumatism during the last five years have his tonsils removed? Both cases of inflammatory rheu-*

matism were preceded by tonsillitis. 6. Is not the percentage of the cases of rheumatism in this section of the country on the increase? 7. Is rheumatism hereditary? 8. What is the benefit of mineral baths for rheumatism? 9. What is the best diet for a person troubled with rheumatism?"

REPLY.—1. There is but little rheumatism in the tropics. A warm, moist climate such as that of Georgia, Alabama, and Mississippi has some advantages, particularly during the late winter and for northern people. But climate is of secondary importance. As rheumatism is not a reportable disease it is impossible to do more than guess whether Chicago's rate is high or not.

2. Yes.

3. The "medicated" part is rank foolishness. Woolen underwear is proper.

4. Yes.

5. Yes.

6. There is no way to tell. The statistics from army posts give information as to the amount of rheumatism amongst soldiers in different parts of the country and in different years. Conclusions from this as to conditions among the general population would be valuable.

7. No.

8. Mineral baths such as Benton Harbor, Mount Clemens, and Martinsville will benefit certain kinds of so-called "rheumatism" and be of no service in others. I should say that what you call rheumatism is an infection of your joints by a germ which gets in through your tonsils. Baths will not help you any during an attack. They will help the soreness that stays after.

9. A good nutritious diet containing meat is proper between attacks in the kind of trouble indicated by your letter. Muscular rheumatism, non-inflammatory rheumatism, rheumatic pains—the gouty type—do better on a low protein diet.

Troubled with Rheumatism.—*E. M. writes: "Will you please inform me whether raw fruit is beneficial in case of rheumatic trouble, and how about beer, whisky, or wines?"*

REPLY.—1. Strongly acid fruits should be avoided in the first stages.

2. Alcoholic beverages of any kind should be avoided.

Rheumatoid Arthritis Treatment.—*R. writes: "What is arthritis? Is it curable? What are its symptoms? Does a person afflicted with it have to abstain from drink (alcohol)? What is the best remedy?"*

REPLY.—1. Arthritis means inflammation of a joint. Rheumatism is one form of arthritis, gout another. No doubt what you have in mind is rheumatoid arthritis.

2. If this is what you have in mind, some cases can be cured; some cannot. The efficiency of the incurable cases can be lowered by neglect.

3. Pain in the joints, slow enlargement, gradual locking.

4. A little more need of abstaining than a well man has.

5. Have tonsils, teeth, and nose put in good order, and kept so. Exercise, massage, nutritious food, vaccines.

Meat and Rheumatism.—*S. J. writes: "I am a woman of 61 years. I have had rheumatism for several years, especially in my knee, and have gouty fingers. I have always been inclined to be anemic. Will beef in*

moderate quantities cause rheumatism? Will meat cause either rheumatism or cancer?"

REPLY.—1. No.

2. It will not cause cancer. A high meat ration is not good for people with certain types of rheumatism. A small meat ration will not harm anybody. A diet made up largely of sour milk in its different forms, cheese, vegetables, and fruits is of some service in some cases of thickening joints in elderly people.

Flannel No Rheumatism Cure.—*Subscriber writes that medicated red flannel underwear is a cure for rheumatism.*

REPLY.—In the good old days our fathers wore red flannel underwear and pretty nearly all had rheumatism. The red flannel cure for rheumatism has had its tryout and has gone the way of the buckeye. Of course, the medicated feature is a straight fraud. Old rheumatics are better off when warmly clad. Flannel underwear is warm. That is the only virtue.

CHAPTER XIII

Gout

THE GOUTY DIATHESIS

Men earn their diseases.

This, however, does not mean that nothing contributes to a man's diseases but his own acts. A sick man may try to make his sickness individual, to pull away from his fellows like a sick dog that crawls under the house, but he cannot escape this fact—that disease is social, and, whether contagious or not, its effects can never be closely limited to the man who is sick. Nor is it a contradiction of the opening statement to say that one generation can no more escape the imprint of its predecessors than one individual can stand alone.

Just as no sick man can stand apart, no generation, from the sickness standpoint, can fail to influence its successors. Dispositions toward obesity, cancer, apoplexy, feeble-mindedness, deafness, heart disease, consumption—called diatheses—are passed on in family strains. They are inherited. One of these, called by Duckworth the arthritic diathesis—the disposition to have rheumatism and gout—is an inherited tendency.

A man with a gouty diathesis is subject to sore throat, rheumatism, and a variety of gouty pains. Such are families where there is a disposition toward apoplexy, heart disease, high blood pressure, arteriosclerosis and chronic Bright's.

But no man has the right to "lie down" because of his individual or family disposition. Such information should guide him in his method of living.

A man whose family "runs to consumption" can eat as much as he wants, and frequently should eat more than he does. Life insurance figures show that fat men are not very liable to consumption.

It is known that a man of the gouty type who has contracted consumption stands a fair show of curing it. Certainly there seems to be an antagonism between the gouty habit and consumption.

Knowledge of these things increases rather than decreases personal responsibility. If a man, knowing that consumption is in his family strain, neglects colds or ventilation, he earns that disease. If a man, knowing that apoplexy, heart disease, or rheumatism is in his family strain, does not regulate his life accordingly, he earns the attacks which come.

Being of a gouty type, there is the greater reason why he should have clean tonsils and teeth, why he should eat and drink temperately and keep himself fit.

As spring comes tradition, to which we are all slaves in some measure, says that we should take spring medicine and blood purifiers. In olden times we went to the woods and dug up sassafras root or gathered some other kind of aromatic herb from which we brewed teas tasty and strong, therefore good.

It was noticed that the members of the family who got most out of the blood purifier were those who went into the woods to dig for the herbs. When herb doctors brought their goods to our doors both herb doctors and herbs fell into disrepute.

Now herb sellers never prosper, druggists begrudge shelf room to spring medicines, and blood purifiers never go except where fortunes are spent in advertising them.

There were reasons for the rise and fall of spring medicines. The rise was because there is and always has been a need that the human animal, housed all winter, should be unhoused in the spring; the fall, because their advocates got their wires crossed. They held on to the herbs and abandoned the exercise and outing of a day in the woods.

In the early spring people have a lot of skin eruptions which may be loosely termed as "gouty." Usually these do not show until the "shank" of the winter, and they get better as the weather opens up in the spring.

A few hours or, at most, a few days in the moist, outside air, a few rounds of good muscle exercise, a few "lathering sweats" and the bad effects of improper living during the winter are washed out, not of the blood but of the tissues. To drink plenty of water along with the exercise is a proper procedure, and it does neither good nor harm to flavor the draught with sassafras and call it sassafras tea.

While a few days of right living in the spring cures the eruptions, heals the skin and makes it soft, takes out some of the joint creaks and pains, and is generally to be recommended as a better procedure than drinking herb teas, blood purifiers, and spring tonics, it should not be forgotten that it is, after all, only a cure and, therefore, does not go to the heart of things.

A better way to prevent gouty aches and pains and skin eruptions in the spring is to live lightly through the winter.

Even though spring penance remove the visible expression of winter sin Old Man Gout sets the senility peg forward a hole.

Lessened contagion and improved environment are moving the life period called old age to the farther side of 70; are setting the old age death mark beyond 90. On the other hand, venereal diseases, lead poisoning, gout, and rheumatism are doing their best to move them toward the period of middle life.

The fight to postpone senility will make great headway as rheumatism is prevented through shielding against infection and gout through simpler, more wholesome living.

In 1911 Mr. Rittenhouse of the Equitable Life Insurance Company published an interesting statistical study showing the growing importance of gout, Bright's disease, and heart disease from the life insurance standpoint.

He estimated the number dying in the United States in 1909 from these diseases as 235,660, as against 126,744 from consumption. He says:

"It seems to me that the life threatened by apoplexy is just as much worth saving as the life threatened by tuberculosis. The loss of adult American life through the more important noncommunicable diseases has increased with extraordinary rapidity. Allowing for the increase in population, about two persons die now where one died thirty years ago from preventable or postponable diseases of the heart, arteries, kidneys, and brain, which usually affect a person in the most valuable and effective years in life."

The principal reason for this increase is that so many of the population who formerly died in infancy, youth, and early maturity are now living to the age of risk from heart and kidney disease.

Let us imagine the citadel of long life surrounded by a series of hedges. As some of the outside of these—infant mortality, typhoid, contagion, consumption—have been cut away, the thorn trees called rheumatism and gout loom constantly larger.

Gout.—*M. M. C. writes: "What is the best kind of diet for one who suffers with gout, and what should be avoided? Is it incurable in a man past middle age? What diet is best for a woman who has enlargement of the liver and weak stomach?"*

REPLY. You should decrease the amount of food you eat by, say, 10 to 20 per cent. Quit eating big, heavy dinners. Swear off. Make up the deficiency in ordinary food taken by eating fruit freely. I should advise the same course for the woman with an enlargement of the liver and a weak stomach, though much more important than the above is my advice to both of you to go to your physician and find out what is the matter with you. Gout, enlargement of the liver, weak stomach are all loosely used terms and cover a good many different conditions, some important, some not.

Lumpy Fingers Show Gout.—*H. E. R. writes: "Will you tell me what causes small lumps, which become sore, to form on the joints of the fingers, and if there is a simple remedy for them?"*

REPLY.—My guess is that these are manifestations of gout. If so, so far as the present lumps are concerned, nothing will cause them to disappear. By changing your diet and your general method of living you will be able to stave off the development of additional lumps.

Diet in Gout.—*C. P. L. writes: "I am a sufferer from gouty fingers. Kindly indicate a diet that might prevent an increase of the trouble. If sweets are forbidden, is honey included?"*

REPLY.—Decrease the quantity of food eaten. Double the quantity of water consumed. Reduce the quantity of meat to one-third your present ration. Increase the quantity of fruit and vegetables. Eat sweets and honey, but with the same temperance that applies to other foods. Do not tolerate constipation. Exercise in the open air.

Rheumatism and Gout.—*D. V. writes: "What is the difference between inflammatory rheumatism and gout? Does diet affect one who is subject to either of these complaints? Is the climate of Chicago much worse than a warmer and drier one for people who are inclined towards rheumatism?"*

REPLY.—1. Inflammatory rheumatism is probably a bacterial disease. The waste products found in the tissues during the disease are secondary in character. It usually occurs in those between 15 and 30. Heredity is not a factor in its causation. Several joints are involved. Gout is distinctly a perversion of nutrition. Heredity is a strong factor. It is a disease of advanced age. The pain is usually localized in the big toes.

2. Diet does not play much of a part in the production of rheumatism. Gout is caused by dietetic disturbances, chiefly the defective oxidation of proteids. Alcohol and rich and highly seasoned foods are important causes.

Malnutrition and bad hygienic surroundings cause what is classed as "poor man's gout."

3. A climate warmer and drier than that of Chicago would be beneficial to those who are strongly rheumatic.

CHAPTER XIV

Diabetes

It will come as a surprise to some who read this article that diabetes is not a kidney disease. In diabetes, sugar produced elsewhere in the body is excreted by the kidneys. It greatly irritates them, and, through this irritation, it causes the secretion of large quantities of urine—quarts or gallons instead of pints. This, of course, means an enormous increase in the work of the kidneys, and, under this strain, kept up for years, the kidneys may give way and Bright's disease result.

But diabetes, while it may eventually cause kidney disease, is not a kidney disease—*diabetes means sugar in the urine, a symptom of a disease elsewhere in the body.*

It may be caused by gluttonizing, gourmandizing, eating more food than the liver can handle. It may be caused by brain tumor. It may be caused by disease of the pancreas. Here are three abnormalities, each characterized by diabetes.

The pancreas, called the sweetbread, is a gland which secretes a part of the digestive juices. In addition to the duct portion, it contains small islands of ductless glands that secrete a substance poured directly into the blood. This secretion turns sugars into harmless substances. When there is not enough of this secretion, the sugar is not changed, but stays in the blood as sugar, and, so long as they have the vitality to do the extra work, the kidneys separate it out.

If a man's diabetes is of the first kind, say the liver kind, all that he has to do is to eat and live sensibly. In fact, the liver kind of diabetes, particularly in a sensible person past middle life, is of no particular consequence. All that he need do is recognize that thereafter he must "sing a slender song," and, doing so, he may live to a round old age—say eighty or a hundred years.

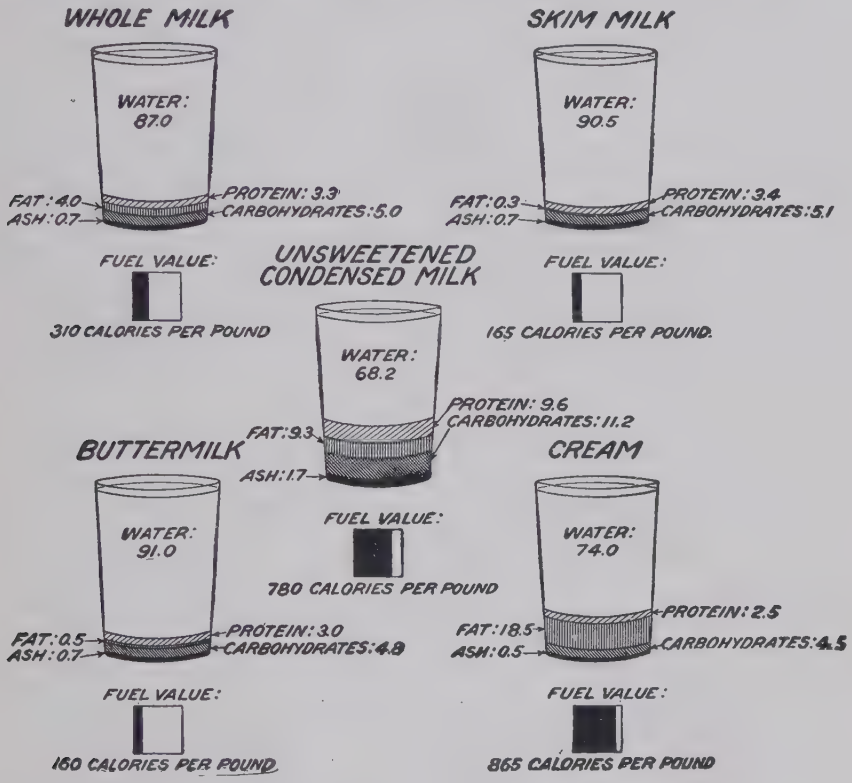
But the last type—those due to deficient secretion of the pancreas—are much more serious. They require the most skillful medical control—and control is a fine word to use in speaking of diabetes.

Diabetics are subject to infections. A boil becomes a carbuncle—one boil develops a crop. A cold develops into pneumonia; consumption follows an exposure which an ordinary man would have no trouble with.

This serves to introduce a phase of another most interesting question—what causes infection? Of course, the infecting germ is necessary—that needs no emphasis—but that is not all. Why is it that germs in the skin of a healthy man do not infect at all or cause a boil at most, while in a diabetic they cause carbuncles, gangrene, and blood poisoning? Diabetes heightens susceptibility to blood poisoning, to pus cocci, and to consumption germs. An ordinary infection in a diabetic will cause the production of highly poisonous acetone bodies. This hypersusceptibility is not peculiar to those having islands of disease in their pancreas.

Acromegalics, cretins, those having Addison's disease and, in small measure, those having goiters, are more subject to infections and infections are more frequently fatal than in those with normal secretions.

The sign by which the diagnosis is generally made is the presence of sugar in the urine. The test for sugar is so easily applied that the diabetic commonly judges of his condition by the amount of sugar in his urine.



Farmer's Bulletin, 363, U. S. Dept. of Agriculture, Chart 11.

FIG. 72.—FOOD VALUES OF MILK.

The test for sugar is to add a few drops of urine to one-half an inch of hot Fehling's solution in a test tube. If the solution turns to a yellow, muddy, opaque liquid, sugar is present. The diabetic comes to know that the amount of sugar present can be gauged by the number of drops of urine required to produce the change in color. He judges of his condition by the amount of sugar in his urine. This is a good enough sign by which one's condition can be judged in an ordinary, slowly progressive case of diabetes. However, it is good judgment for the diabetic to keep in touch with his physician and to report to him at stated intervals for a careful, complete examination.

Because the diabetic watches the sugar in his urine he frequently gets some wrong ideas as to the origin of sugar in the urine and the importance of sugar as an article of diet.

The kidneys do not manufacture sugar. They merely remove sugar from the blood. The blood of all people contains sugar. In a normal person

the sugar of the blood is burned into carbonic acid. Sugar is manufactured everywhere in the body. Some of it is made from starch; some from fat, and some from protein. Some of it is absorbed as sugar from the food; some is taken in the food as starch and converted into sugar by the digestive apparatus. The surplus sugar is stored as glycogen. Some of the blood is made from glycogen, the stored sugar surplus.

When the sugar in the blood is in excess and the sugar appears in the urine, the common way to begin treatment is by cutting off that part of the sugar excess which comes from the diet. The articles cut out are honey, sugar, ordinary flour or bread, biscuits, rusks, toast, arrowroot, oatmeal, cracked wheat, potatoes, tapioca, sago, beans, turnips, carrots, parsnips, asparagus, artichokes, squashes, beets, corn, rice, hominy, cabbage, lettuce, figs, grapes, prunes, apples, pears, bananas, jams, syrups, sweet pickles, chocolate, cocoa, liquors, wines, beer, liver, and oysters.

The foods which are eaten are meat, poultry, game, bacon, ham, fish, eggs, cream cheese curd, buttermilk, cream, butter, olive oil and fats of all kinds, sauerkraut, lettuce, sorrel, mushrooms, cress, spinach, chicory, celery, cucumbers, mustard, sour pickles, lemons, oranges and nuts, gluten breads—those kinds that contain only a small percentage of starch—bread crusts, milk and alkaline mineral waters.

On the one hand food is not the only source of sugar, and on the other the diabetic diet may be so low in heat and energy units that the tissues of the body are burned to supply the deficiency. Therefore some diabetics do better when given a diet that is more liberal in starches and sugars.

Old diabetics, especially those with a tendency to acid coma, need some starch and sugar in their diet. Some of them can be shielded by giving them a very large amount of fat, butter, olive oil, cod liver oil, cotton seed oil, fat meat. Some get relief by adding two apples to the daily ration. Some need oatmeal, and some potatoes cooked with the jackets on.

Diabetes—Cause and Diet.—*M. L. F. writes: "Will you kindly advise the real cause of diabetes and the best course to pursue to cure same? Am a middle-aged woman formerly of stout and healthy constitution."*

Reply.—1. Diabetes may be caused by overeating—eating more than the liver can handle. It may also be caused by a diseased pancreas or tumor of the brain.

2. The diet is the most important thing to be considered in treating a case of diabetes. The food should be nourishing and at the same time as free from carbohydrates—sugars and starches—as possible. Try the following:

Breakfast

Four prunes cooked without sugar.
Fresh bran muffins, with plenty of butter.
Oatmeal with lots of cream.
Coffee.

Lunch

Poached egg on toasted bran muffin, buttered.
Crackers (diabetic) and a bit of cheese or some fresh rhubarb.
Tea or milk with plenty of cream.

Occasionally chocolate, sweetened with saccharin, or buttermilk.

Rhubarb sweetened with saccharin and glycerin, after it is cooked (use saccharin sparingly).

DINNER.

Any meat except liver.

Fish of all kinds.

Vegetables—Cabbage, cauliflower, asparagus, green beans, lettuce, radishes, olives, celery, tomatoes.

Desserts—Custards, made with very rich milk; strawberries, fresh. Sour orange and grapefruit. Fresh peach cobbler, batter made with gluten flour.

Cheese, any kind.

Nuts, any kind except chestnuts; often peanuts are excluded.

A diabetic should never allow himself to get ravenously hungry. This is one of the great dangers that he faces, as it may cause him to overeat or eat the wrong food. One is about as bad as the other. If a diabetic feels the need of food between meals he can with safety take an eggnog with all the cream in it he can stand, or cup custard. It is a good plan to make up custards, baked in little brown bowls (individual) and keep on ice to eat between meals when hungry. A glass of buttermilk or nuts will often relieve a sense of hunger. A diabetic should, by all means, have medical advice.

Possibly Diabetes.—*C. D. H. writes: "What is the cause of passing so much urine? I have to get up five and six times every night. I am troubled a great deal with my back and it gets so sore at times I can scarcely bear the weight of my clothing on it. I have always been a very light eater, but of late I am hungry all the time. I never seem to get anything that satisfies my hunger."*

REPLY.—Have your urine examined for evidence of diabetes.

Diabetes Sometimes Curable.—*J. H. writes: "Is diabetes a curable disease? Give a list of things a diabetic may eat. How many years may a person 52 years old expect to live? Is medicine any good as a curative for diabetes? The patient lost twenty pounds before the disease was suspected."*

REPLY.—1. Some cases are curable, some are fatal, and some run on indefinitely.

2. A diabetic can eat anything. He should eat sparingly of foods that contain much sugar and starch—for instance, bread, pastries, desserts, and potatoes. However, your question cannot be answered in this space. Get a cookbook for diabetics or von Noorden's small book on diabetes.

3. Ordinarily a diabetic 52 years old can count on many years of life. Rapid loss of flesh is a bad sign.

4. As a cure, little; to relieve symptoms, medicine is of service.

Diabetes and Bacillus Bulgaricus.—*F. M. asks: "What curative value has 'Bacillus bulgaricus' in diabetes?"*

REPLY.—I do not think it has any. I have seen an abstract of Metchnikoff's paper read in Paris in June and think those who have written me misunderstood his article. At most, this bacillus would help only that kind of glycosuria due to eating more sugar and starch than the system

could convert. It would not help in cases of diabetes due to nerve, brain, pancreas, or to some liver changes.

Symptoms of Diabetes.—*C. K. writes: "1. What are the symptoms of diabetes? 2. Does continued sitting affect the kidneys and are fruits and sugar injurious to the kidneys? 3. What is the best diet for persons with kidney trouble? 4. What causes a steady ache in the small of the back and spells of weakness and faintness?"*

Reply.—1. Sugar in the urine, frequent urination, large quantity of pale, heavier-than-water urine. There are many other symptoms. These are the more frequent and the easiest recognized.

2. No, as to both questions.

3. There are many different kidney troubles. The two most frequent are Bright's disease and diabetes. For Bright's disease the caution is against overeating, especially overeating of meats. For diabetes, against overeating, especially overeating of starch and sugar.

4. The most frequent cause of backache is nervousness and nerve tire. Sometimes Bright's disease causes backache. The causes of weakness and faintness are many and varied. To try to say what causes them with you would be as risky as traveling in a flying machine.

Examination of Urine for Diabetes.—*P. O. L. writes: "Please tell me the symptoms of diabetes."*

Reply.—Any physician or laboratory and some druggists can examine for diabetes. The tests are simple. The most reliable symptom is the presence of sugar in the urine. A large quantity of urine is a symptom of some value. Repeated boils or carbuncles suggest the possibility of diabetes.

Stages of Diabetes.—*M. W. writes: "1. Is diabetes a liver trouble or disease? 2. When the sugar deposit is thirty-four grains to the ounce, is the condition serious? 3. What is acetone? When this stage is reached, is it the last in this disease? 4. What are usually the last or serious developments? 5. When developed between the ages of 50 and 60, is it rapid or slow in progress? 6. Is it hereditary? What seems to be the most general cause of this trouble?"*

Reply.—1. Diabetes is the term usually used to cover all conditions that result in sugar in the urine. Sugar in the urine may result from disease of the brain or pancreas or from some of the disturbances of liver function. Therefore some cases of diabetes are due to liver trouble.

2. Yes; or it may easily become so.

3. Acetone is the result of acid fermentations due to incomplete oxidation of albumin. It represents an advanced, though not necessarily the last, stage of the disease.

4. Marked susceptibility to infections—acidoses—profound intoxication with the products of incomplete oxidation.

5. Usually slow.

6. (a) Some families suffer from it more than others. Strictly speaking, it is not hereditary. (b) Overeating.

Not Diabetes Symptom.—*A. M. W. writes: "Does a smarting and aching after urinating indicate diabetes? Is diabetes curable? Ought one to follow some diet, and what should it be? For many years my ears have*

rung. My hearing is acute. What occasions those sounds? Is there any connection between them and frequent expectoration of a clear mucus? Some days the expectoration is almost constant. Isn't it weakening to expectorate so frequently? I appear to have the average health and compare favorably with others except for the ills I mention, which may be reducing my vitality."

REPLY.—1. No.

2. Some cases are. Most cases are not bad, but one can learn to live with diabetes and thus live out his full expectancy.

3. If one has diabetes he should have his physician outline his diet and then supervise both as to diet and general habits.

4. Probably some infection which traveled to your ears years ago.

5. Probably, I think.

6. No. Your physician will probably find nothing of importance wrong.

Testing for Sugar.—*F. E. F. writes: "How is urine tested for the presence of sugar?"*

REPLY.—By heating about a dram of Haines' solution and adding a few drops of urine. Sugar turns it yellow or reddish yellow. Iodin is not used. Albumin is tested for by placing about an inch of pure nitric acid in a test tube and floating some urine on it. If albumin is present a white solid ring forms at this line of contact. The specific gravity is taken with a special apparatus called the urinometer. Casts, pus, and blood are found by microscopic examination. These are the more usual and simpler tests.

Buttermilk in Diabetes.—*B. M. C. writes: "Is a quart of buttermilk a day too much to be taken by an invalid who has diabetes and hardening of the arteries and is unable to take exercise of any kind, being seated almost the entire day?"*

REPLY.—If he takes neither meat nor vegetables in addition—no. If the quart of buttermilk is a part of a fairly liberal diet—yes.

Diabetes not Hereditary.—*K. K. writes: "Will you kindly tell me something about diabetes? Is it hereditary? Is it contagious? Is it liable to be contracted by both sexes? What are the first symptoms or stages? Is one 68 years old liable to have it?"*

REPLY.—1. Diabetes is not a hereditary disease. Certain races are more susceptible to it than others. In essence it is caused by long continued nervous strain, which results in a disturbance of the pancreas and liver. The kidney symptoms are secondary.

2. It is not a contagious disease.

3. Both sexes suffer from diabetes. It not infrequently happens that man and wife are both affected by it. The relationship is not clearly understood.

4. The first symptoms are increased thirst and sometimes increased appetite, a larger amount of water passed through the kidneys than usual, emaciation, and itching of the skin following.

5. It is possible to have diabetes at the age of 68. Diabetes in a person 68 is not grave. The younger the diabetic the graver the outlook.

Diet and Diabetes.—*L. M. writes: "1. Can diabetes be cured in its early stages? 2. What bread should one eat? 3. Is saccharin injurious?"*

REPLY.—1. Diabetes is a symptom present in several different conditions. Some are curable; some tend to persist indefinitely without doing great harm; some are incurable and rapidly progressive. The outlook in any given case must depend upon the conditions of that case.

2. Do not accept any diabetic bread merely because it is advertised as such. Insist upon a statement as to the amount of starch present. Do not try to do without starches entirely. Know how much you are eating and keep your starch diet below your danger line, or, better still, your harm line.

3. It is. However, if you are a diabetic and must have sweets, saccharin is less injurious than sugar. The best plan is to learn to do without sweet tasting foods and drinks.

Teeth in Diabetes.—*J. G. O. writes: "I am a diabetic and for the last five years have used saccharin as a sweetener for such food as requires it. I have an excessive deposit of tartar on my teeth, and consequently must fight pyorrhea constantly. Is it not dangerous to use saccharin continually as I do? Does it contribute to the tartar deposits? What can I do to prevent the tartar deposits and pyorrhea?"*

REPLY.—1. The referee board of the Department of Agriculture has decided that saccharin is harmful. Use none, or the minimum quantity.

2. No.

3. There is nothing to do except to visit your dentist for treatment of your teeth and gums at regular intervals. By intelligent care, a diabetic can live to a ripe old age. By intelligent care, also, pyorrhea can be held in check for many years.

CHAPTER XV

Pellagra

No other statement made at the recent meeting of the American Public Health Association was so important as that of the Public Health Service that the pellagra situation had been solved, that is, from the public health standpoint. As I understand the Service's position it is this:

Pellagra is caused by a diet out of balance in certain directions. It can be prevented by the habitual use of a properly balanced diet. Where in a given closed community, for instance a hospital, pellagra is found to be present to a considerable degree, the disease can be banished by a rearrangement of the diet. In an open community, ordinary town and country life, the disease can be eradicated according to the degree of change in diet which the people can be induced to make.

So much for the position of the Public Health Service on the positive side. On the negative side it holds that the disease is not contagious nor communicable; that it is not spread by flies or insects of any sort; that it is not caused by eating cornmeal; that it is not the result of living in insanitary houses.

As to the ability of a change in diet to cure the individual case of pellagra, that depends on the stage of the disease and other factors. On that point the Service had but little to say. Its work is with public health, not personal health, and still less with curative medicine.

The changes in the diet recommended by Dr. Goldberger to prevent pellagra consist essentially in increasing the amounts in the daily diet of good fresh meat, peas, and beans.

"The eventual eradication of pellagra from our South will depend largely on the successful introduction of common dried legumes into the winter dietary. A valuable step in this direction would be an increase in the cultivation of some of the varieties of peas and beans and their preservation in the dried state for winter consumption. The farmers of the far south are planning to decrease greatly the cotton acreage in 1915. They are investigating other crops. Under the stimulus given by the Public Health Service in advocating this preventive for pellagra, there should be a large demand for peas, beans, fresh meat, milk, and eggs."

Cornfield peas grow well in most portions of the South. They are a good winter dish. Perhaps Mexican frijoles will also suit the southern soil and climate.

Incidentally it occurs to me that the Public Health Service should inquire as to the amount of pellagra among the frijole-eating Mexicans.

Although the Public Health Service concerns itself with the problems of public health, in the main it can never keep closely within its field, nor keep

wholly out of other fields. The fields of public health, personal hygiene, and curative medicine constantly overflow one into the other.

Along with Goldberger's recommendations of a certain diet list for those who would avoid pellagra there goes a detailed diet list for those who have the disease and would be cured.

He says:

"The patient should be given and urged to take (if necessary, tube fed) an abundance of fresh milk, eggs, fresh lean meat, beans, and peas (fresh and dried, not canned).

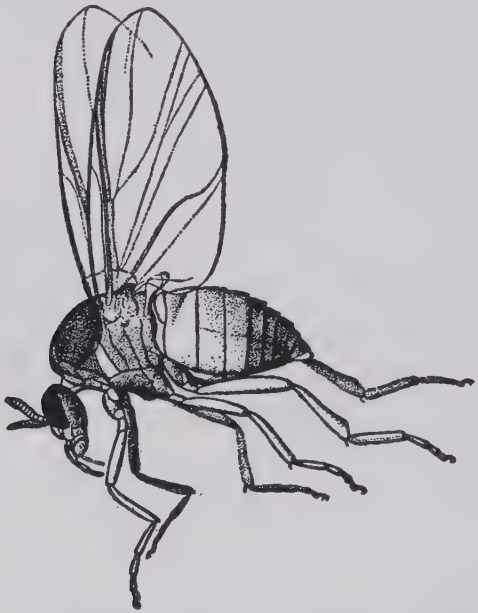


Fig. 73.—Buffalo Gnat, accused by some authorities of spreading Pellagra. (After H. Garman.)

"Milk.—Fresh milk alone, or in alternation with buttermilk, should be given freely. An adult should be urged to take not less than a pint and a half to two pints in twenty-four hours.

"Eggs.—Fresh eggs should be allowed freely. In addition to the milk and meat an adult should take not less than four eggs a day. In certain of the severer forms it may be necessary to give the eggs in the form of albumin water.

"Meat.—The meat should be fresh, lean meat. Whether all fresh meats are equally valuable in treatment we do not know; future studies will have to determine this. Our experience has been with beef alone. This may be served as scraped beef, as a roast, or as steak. Where mastication is painful, meat juice may be given instead. An adult should be urged to take at least half a pound of lean meat a day in addition to the milk, eggs, and legumes. It may be necessary in some instances to work up gradually to the point where these quantities can be taken.

"Legumes.—We have been much impressed with the favorable results following the use of beans and peas alone. The beans and peas should be fresh or dried, not canned. A palatable pea or bean soup should be prepared and may be given freely. In addition to or in alternation with the soup the beans or peas should be served and eaten in any one of the other well-known forms.

"In cases presenting only moderate or no gastro-intestinal symptoms there may be added in restricted amounts oatmeal, rice, and barley as cereals, potatoes and onions as fresh vegetables, fresh or dried (not canned) fruits, and wheat or rye bread or biscuits."

DIAGNOSIS AND TREATMENT OF PELLAGRA

In a paper read before the last meeting of the Associated Fraternities of America, Dr. Cloyd of the Woodmen of the World said that in 1911 pellagra was responsible for about three-quarters of one per cent of the deaths amongst

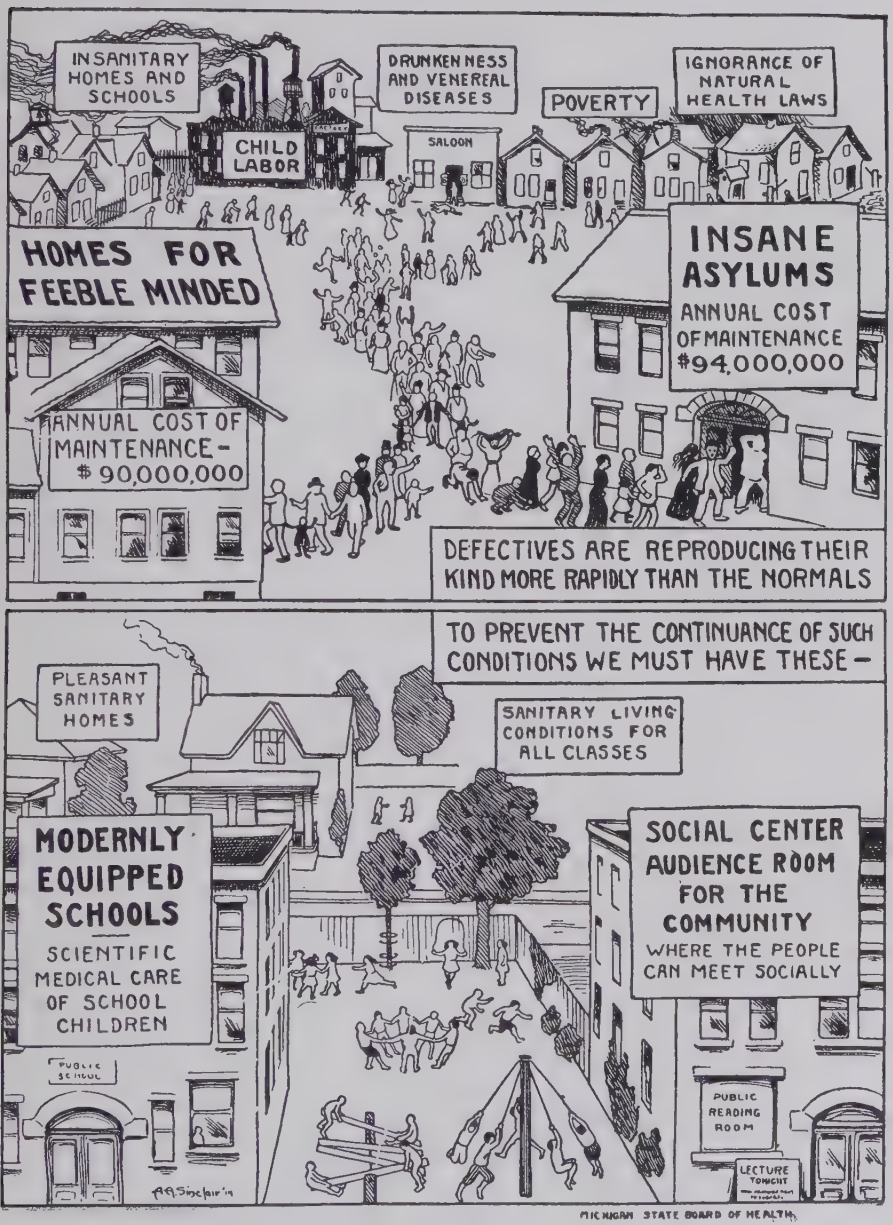

INSANITARY HOMES AND SCHOOLS
CHILD LABOR
DRUNKENNESS AND VENEREAL DISEASES
SALOON
POVERTY
IGNORANCE OF NATURAL HEALTH LAWS
HOMES FOR FEEBLE MINDED
ANNUAL COST OF MAINTENANCE - $90,000,000
INSANE ASYLUMS
ANNUAL COST OF MAINTENANCE $94,000,000
DEFECTIVES ARE REPRODUCING THEIR KIND MORE RAPIDLY THAN THE NORMALS
TO PREVENT THE CONTINUANCE OF SUCH CONDITIONS WE MUST HAVE THESE -
PLEASANT SANITARY HOMES
SANITARY LIVING CONDITIONS FOR ALL CLASSES
MODERNLY EQUIPPED SCHOOLS
SCIENTIFIC MEDICAL CARE OF SCHOOL CHILDREN
SOCIAL CENTER AUDIENCE ROOM FOR THE COMMUNITY
WHERE THE PEOPLE CAN MEET SOCIALLY
PUBLIC SCHOOL
PUBLIC READING ROOM
LECTURE TONIGHT
A.B. Sinclair in
MICHIGAN STATE BOARD OF HEALTH

FIG. 74.

the members of that order; that in America there were nearly 10,000 known cases of the disease; that while it was not contagious, no nurse nor physician nor other person having ever been known to contract the disease either in this country or in Europe from contact, nevertheless pellagra is spreading rapidly in all parts of the United States.

He thought that there is—and beyond question he is right—a great need that physicians learn how to recognize pellagra when they see it.

A few years ago one of the great diagnosticians of a northern city, while visiting in a southern state, carefully studied a typical pellagra and made a diagnosis of glossitis. That there was inflammation of the tongue—glossitis—was true, but that was present as one of the symptoms of pellagra.

This able man was so struck by the red tongue present in the case that he saw that he made a diagnosis of inflammation of the tongue. Other men have seen nothing beyond red, cracked skin in some case or other and have made diagnoses of sunburn, eczema and like diseases. Others have called pellagra diarrhea, and still others have not been able to see beyond the mental state and have diagnosed cases of pellagra as melancholia.

The moral is that both physicians and people must be on the alert for pellagra as an underlying cause of certain symptoms any one of which in a given case may stand out like Gibraltar.

A very red, fiery, and painfully burning tongue is quite characteristic. The sensation of burning is felt all down the throat and gullet to the stomach. Diarrhea is generally present. It may alternate with constipation. The stools are very offensive. The breath is highly offensive. In my experience, these digestive symptoms from mouth to intestines are the most uniformly present and most characteristic.

The skin symptoms consist of a bright red sunburn with thickening, roughening, scaling of the skin. As the skin scales off it leaves behind a pigmentation similar in appearance to that of sunburn, and also similar in its distribution—the hands and forearms, the face, neck, and upper chest. The line between the affected and unaffected skin is sharp as is sunburn. When one passes his fingers over the affected skin it feels "as if sand were in the skin."

The nervous symptoms from nervousness through melancholy to insanity are usually later and of less diagnostic value than the digestive disturbances and skin changes.

As to treatment we quote Dr. Cloyd from the *Western Review* of November, 1912:

"The diet should be easily assimilable and highly nutritious. Meats, as a rule, agree with pellagrins and form an important part of the diet; eggs can generally be used to advantage; milk is useful when it agrees, but as it often does not, peptonized milk, buttermilk, etc., should be used. Vegetables and cereals also can be given freely. Corn in all forms should be avoided until the corn theory of the etiology of the disease is disproved. The diet should be adjusted to the individual case, always remembering that the problem of the bodily upkeep in pellagra is of basic importance and should never be lost sight of from the beginning of the management.

"General hygienic treatment is of great importance. Plenty of fresh air, quiet and pleasing surroundings, rest, and regularity in daily habits are es-

sential. Frequent baths are important in the treatment of pellagra; hot and cold baths, simple and medicated douching, moist or dry rubs accompanied by special massage, have proved their worth. The special methods chosen must be adapted to the individual case.

"Drugs are used in pellagra to treat the special symptoms as occasion arises. No specific treatment has yet been found. For general constitutional treatment arsenic in some form is generally used.

"At the present time the measure that promises the greatest amount of success is removal of the patient to a high, cool altitude. The proof of this is found in the fact that most incipient cases clear up in winter. Patients sent

State Board of Health, Jacksonville, Fla.

FIG. 75.—ALERT AS TO CONTAGION IN HIS CATTLE—INDIFFERENT AS TO CONTAGION IN HIS OWN FAMILY.

to Asheville, North Carolina, and Tate Springs, Tennessee, have nearly all been benefited. I do not know of any patients who have been sent to the mountains of Colorado or the west, but it appears to me that a residence in that region ought to be tried."

What shall the pellagrin do? First, change his diet. Eat more protein and less starch. Second, live more hygienically. These he can and must do. If he can he should do the third—seek out the base of some perpetually snow-clad mountain. As the season progresses he should climb, keeping always above the snowline.

Concerning Pellagra.—*P. J. wants to know some of the symptoms of the beginning of pellagra and other information concerning the disease.*

REPLY.—Pellagra is widely spread. There is much of it in Chicago and in the surrounding states, as well as in the South. Physicians in the South have learned how to recognize it in the last few years. Physicians in this part of the country (the Middle West) have not learned how to diagnose it until it is so far advanced that the subjects have had to be placed in insane

asylums. The reports of cases in Illinois have come from the Dunning institution and from the state asylums, particularly Bartonville.

Something should be done to let people know what symptoms point toward pellagra. Most cases begin with a persisting heartburn. This is followed by diarrhea. If a man has a persisting heartburn and a diarrhea which keeps up, he had better see a doctor and get an examination. One of the things which he should ask is: Does this mean pellagra? About the same time the mouth gets red and raw areas are sometimes seen. The gums get sore. The tongue is red and patchy. The patient begins to lose weight. The patient is "blue" and melancholy. He thinks that his friends are not treating him right and that his family is going back on him.

The eruption starts on the hands and face. At first it looks like an ordinary browning from the sun. Later it looks like a deeper sunburn. Sunburning in a person who has not been exposed to the sun enough to burn should always excite suspicion. One of the first diagnoses made in South Carolina was a man who sunburned brown in the summer, and he had not been out enough to account for it. But the doctor was not suspicious. In midwinter he turned up with a bad sunburn. His physician got suspicious, studied him more carefully, and made a diagnosis of pellagra.

A diagnosis in an early case can only be made after a careful study of the case. That is the work of the doctor.

The part of the patient is to get suspicious and go to a doctor if there is a heartburn which keeps up, a continued diarrhea, persisting sore, red gums, persisting red, splotchy tongue, blues, sunburn out of season or not explainable by exposure.

Symptoms of Pellagra.—*H. T. W. writes: "What are the most pronounced symptoms of pellagra?"*

REPLY.—1. Digestive system—Fiery red tongue, burning pain extending from the mouth to the stomach, diarrhea, offensive stools, offensive breath.

2. Skin—Sunburn on the hands and forearms, on the face and on the chest. The sunburn is usually limited to the exposed parts of the body. It usually looks like an ordinary sunburn. It may come without any exposure to the sun.

3. Mental symptoms—Those of melancholia, mental distress, mental weakness, some delusions.

The digestive symptoms generally come first and predominate. The skin symptoms next. The brain symptoms last. Every case has some of the above symptoms; few have all of them.

Cause of Pellagra.—*S. writes: "What is the cause of pellagra? What is the length of time one generally lives after the first symptoms? Would you advise doctoring with home doctors or not? Is there such a thing as eating certain kinds of food and being protected from it? Do people have pellagra in a cold climate?"*

REPLY.—1. The cause is not certainly known.

2. Some say two years. Some cases live longer than that. Many die rather quickly after they know of the disease.

3. Your home doctors know about pellagra better than anybody else. Beware of pellagra cures.

4. The Public Health Service says so. Ask Congressman Humphreys to get the public health report of October 23 for you.

5. Yes.

Warnings of Pellagra.—*D. A. writes: "Will you please give the symptoms of pellagra? Can a person have the disease without feeling some ill effects? Is there any other disease similar to it?"*

REPLY.—What you want to know is what symptoms should cause you to suspect pellagra and investigate further.

1. A persisting red sore tongue.
2. Burning in the esophagus or gullet.
3. Sunburn without adequate cause. Generally speaking the sunburn is in the ordinary locations of sunburn—the neck, chest, shoulders, and forearm.
4. Sense of weakness for which there is no other cause.
5. Persisting indigestion.

Any one of these symptoms should cause you to investigate the possibility that you have pellagra. The disease is often confused with other diseases.

Thousands of Cases.—*S. W. R. writes: "Will you kindly advise whether there has ever been an authentically diagnosed case of pellagra in North America? I should also like to have you state what the disease is and its cause."*

REPLY.—Yes, many thousands. Several die of it each year in Chicago. They are so registered in the Bureau of Vital Statistics. Some were diagnosed by a man who had seen a great deal of pellagra in the United States and abroad. Its cause is not determined. The symptoms fall into three groups: Those which affect the digestive apparatus, those which affect the brain, and those which affect the skin.

CHAPTER XVI

Beriberi

This disease is of no direct interest to the people living within the United States. To us it is a medical curiosity. Few of our people have it. Never in our history have many people had it. There is no likelihood that they will ever have it. Then why take the trouble to learn about it?

There are several reasons. We see in the fight against beriberi one of the conquests of preventive medicine. From a study of the proved facts about beriberi we get some facts that are of value on the general food situation.

Finally, beriberi is somewhat like pellagra and infantile scurvy, and the fight against beriberi may teach us something about these other diseases.

Since we took possession of the Philippines the United States army has maintained a small native army known as the Philippine Scouts. These 5,200 natives are scattered in small companies throughout the islands. Although widely scattered, they are fed a uniform ration provided by the government.

The government spent six years in trying to develop a plan to combat beriberi.

In 1908, 618 cases and in 1909, 558 cases of this disease developed in this small army. Some of these cases died, and some were invalided on account of disability.

By 1910 the army authorities had matured their plan, and in that year they got it going in earnest. In 1910 the number of cases dropped to fifty. In 1911 there were three cases; in 1912, two; in 1913, none, and in 1914 (the first six months), one.

Out of each 1,000 scouts in 1908, 121 were disabled from beriberi—about one-eighth of the entire command. Out of each 1,000 in the last four years twenty-eight were disabled per year—about one for every 4,000. The last death of a scout from beriberi occurred in 1911. In that year there was one death from this disease.

The largest number of admissions to the hospital for this disease in any month was in January, 1909—138. The last month in which more than one case was admitted to the hospital for beriberi was August, 1910—two cases. No case was admitted to the hospital from June, 1912, to April, 1914.

There has been no case of beriberi among white troops serving in the Philippines since January, 1910.

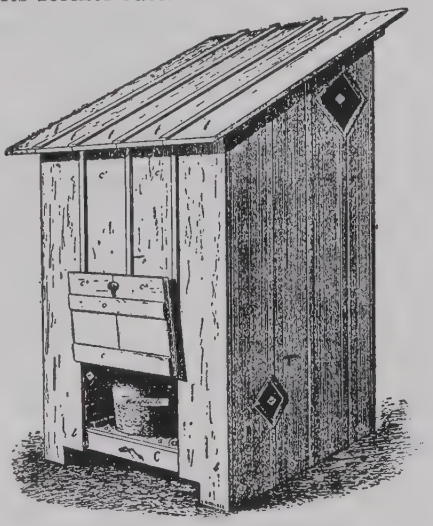
The United States army has succeeded in the last ten years in entirely controlling a group of very important diseases, not only in its own ranks but in the communities over which it has had control. These diseases are yellow fever, smallpox, typhoid fever, and beriberi. These four diseases have been absolutely wiped out in the various divisions of the army. If the army has been able to wipe out these diseases, it will be able to wipe out others.

What we are more interested in is the next proposition. If the army can

wipe out these diseases, then civil populations can wipe them out. They have already wiped out yellow fever. When will they wipe out smallpox and typhoid?

Furthermore, the army has demonstrated its ability greatly to lessen pneumonia, malaria, and venereal disease. The reports from Panama show that it has been able to lessen pneumonia to one-half and malaria to one-tenth of its former rates. The statistics of the army itself show that it has lowered the venereal disease rate to one-third of its former rate.

If the army has accomplished this much with pneumonia, why should we not begin? If malaria is lessening the price of land in Mississippi and malaria can be controlled, why does not Mississippi control it?



Virginia Health Bulletin.

FIG. 76.—A GOOD TYPE OF DRY EARTH PRIVY. Door raised to show bucket.

The army ration in use by the Philippine scouts when beriberi was so prevalent consisted of fresh beef, twelve ounces; flour, eight ounces; baking powder, one-third of an ounce; rice, twenty ounces; potatoes, eight ounces; coffee, roasted and ground, one ounce; sugar, two ounces; vinegar, salt and pepper.

In place of fresh beef one of the following was substituted at times: bacon, eight ounces; canned meat, eight ounces; canned or fresh fish, twelve ounces. In place of the flour and baking powder, hard bread, eight ounces, was substituted at times; in place of the potatoes, eight ounces of onions.

Instead of twenty ounces of polished rice were substituted sixteen ounces of Filipino rice No. 2 or Sargon rice. These are undermilled or unpolished rices. In place of potatoes they used camotes, eight ounces, and mongos, four ounces. Camote is a vegetable akin to the sweet potato; mongo is a species of pea. The coffee ration was cut in half and half an ounce of ginger root was issued. The use of Filipino No. 2 rice continued until June, 1911.

Since June, 1911, the ration in use has been the following: fresh beef, twelve ounces; flour, eight ounces; baking powder, one-third ounce; unpolished rice, twenty ounces; potatoes, eight ounces; coffee, roasted and ground, one ounce; sugar, two ounces; vinegar, eight one-hundredths gill; salt, two-thirds ounce; black pepper, one-fiftieth ounce.

At times in place of fresh beef eight ounces of bacon or eight ounces of canned meat, or twelve ounces of fish, fresh or canned, was used; in place of the flour, eight ounces of bread; in place of potatoes, eight ounces of onions were used.

While twenty ounces of unpolished rice was the allowance, the authorities insisted that not over sixteen ounces be drawn, but that some other vegetable food be substituted. For instance, in place of four ounces of the rice they ad-

vised sixteen ounces of beans. They required that as much use as possible be made of such native products as camotes, mongos, and squash.

The essential difference between the diet under which the men got beriberi and that under which they escaped it was in the rice. The difference was not so much in the amount of rice eaten nor in the proportion of rice to the other foods in the different diets. The difference was in the quality of the rice.

The men developed beriberi when they ate high grade polished rice. They did not get it when they ate undermilled or unpolished rice. The Filipino No. 2 rice evidently contained a good deal of rice mills.

Major Chamberlain of the United States Army, who was in charge of the beriberi work among the scouts when this change was being effected, says:

"Filipino No. 2 rice was unsightly and consequently aroused opposition among the men. Ginger root could not be made popular. Therefore the ration was changed on May 8, 1911, to that shown in table 4 (the last given), which has continued in force to the present time.

"This ration obviates the practical disadvantages of the preceding one, yet embodies all the features important for beriberi prevention, viz., use of unpolished rice in an amount not exceeding sixteen ounces and compulsory consumption of sixteen ounces of beans. The beans used are ordinary dried navy beans, for which mongos may be substituted.

"The undermilled rice is of the highest grade, has a white pericarp, is palatable and not unsightly in appearance, and contains 0.4 per cent of phosphorus pentoxid."

In the opinion of Dr. Chamberlain the phosphoric acid of rice is not the element which prevents beriberi, but it is present in that portion of the outside of the rice berry which is necessary if beriberi is to be prevented. Therefore to determine the amount of phosphoric acid present is the easy way to tell whether the rice will cause beriberi or not.

The vitamin necessary to prevent this disease is contained in considerable quantity in the hard white outer layers of the berry.

Let no one understand that rice causes beriberi. It is treated rice which does it. No food is better for beriberi than unrobbed rice.

Other foods which have been shown to produce beriberi are fine wheat flour, white wheat bread with or without yeast, macaroni, ship biscuit, sago, hominy, cornstarch, various breakfast foods, and potatoes.

Do not get the idea that eating a mixed ration in which there is fine wheat bread will cause beriberi. It will not. If the diet consists of white bread entirely, or largely of it, or if there is nothing in the ration to supply the something which was taken from the wheat berry in the milling process, beriberi develops.

Another fact which has been well established is that prolonged cooking and cooking at high temperatures destroys the vitamins which prevent beriberi. If a food substance which in the raw state contains barely enough vitamins is cooked at a high temperature above 250 or is boiled at a lower temperature for a long time, enough of its vitamins will be destroyed to put it into the class of foods capable of producing beriberi. A temperature of 200 does not affect it. The substance which prevents scurvy in babies is destroyed by a temperature of 200.

In a general way what we learn from the work with beriberi is that we have been in the habit of overrefining and overpreparing our foods. We have got too far away from nature. We shall be better off if we backtrack a little on the route by which we have come up from the cave man.

While it is not necessary that we should grub roots with our fingers, crack nuts with our teeth, and eat raw meat, we shall be somewhat more

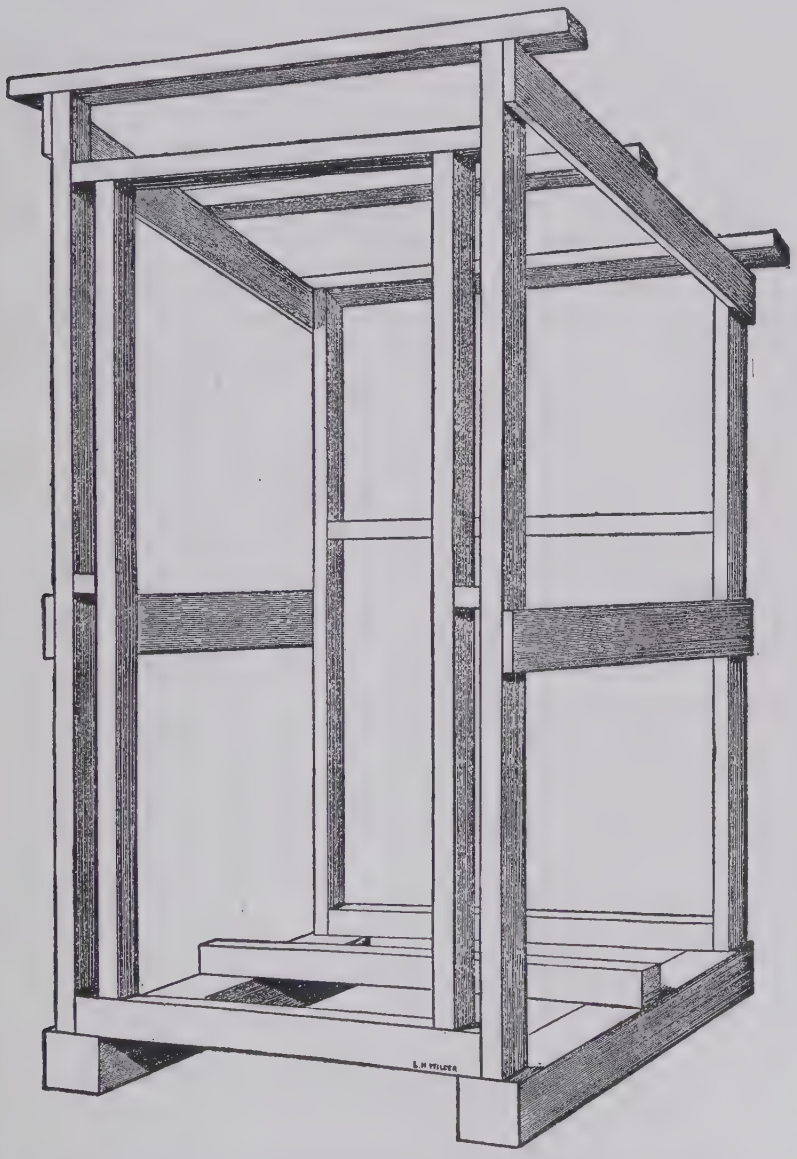


FIG. 77.—FRAMEWORK FOR MODEL PRIVY HOUSE. Such a house is *not* necessary, but can be conveniently and cheaply built about the privy box. The latter is the all-important part of the privy.

resistant to disease and somewhat freer from what the doctors call "diathesis" if we eat more bran with our cereals, our rice, and our flour; more peeling with our fruit, more fiber with our meat, and more fresh vegetables and fruit, and if some time during the day we eat some suitable article of diet in the raw state.

Beriberi begins with a loss of appetite, headache, a mild fever, pain in the stomach and a sense of weight in the chest. The disease progresses unevenly. It gets worse for a while and then lets up, gets better and then gets worse.

There are four varieties of the disease. In the mildest form there are pain in the legs, swelling of the ankles, weakness in the muscles of the legs, and finally a loss of sensation below the hips. In the atrophic form the weakness of the leg muscles is followed by paralysis and muscular atrophy. The muscles shrink up somewhat as in infantile paralysis. Patches of skin on the legs lose all sensation. In other areas there are neuralgic pains. There is generally dropsy in the feet.

In another variety dropsy of the legs overshadows the wasting. The dropsy may be elsewhere in the body, as well as in the legs. In this variety palpitation of the heart and difficult breathing are prominent symptoms.

In the fourth variety the prominent symptom is weakness, accompanied by great disturbance of the heart. The heart disturbance takes the form of palpitation. Breathing is difficult.

As a result of the deficiency in the diet there is inflammation of certain nerves. Just which nerves are most inflamed determines which symptoms are most prominent. In most cases the involved nerves are those which run to the legs; therefore, in most cases the prominent symptoms are paralysis of the legs, wasting of the leg muscles, dropsy of the legs, and a division of the skin of the legs into painful areas and areas in which there is no feeling.

The symptoms of pellagra are very different from those of beriberi. The nerves and organs involved differ from those of beriberi. And yet when we analyze more closely, when we study the phenomena which lie below the surface, there is a good deal of similarity between the diseases.

The present trend of opinion is that the cause of pellagra lies in freak diets. The Public Health Service is advising that the disease be prevented by changing the diet. One of the changes which it recommends is that more beans and peas be eaten. With this exception the changes in diet recommended for pellagra are not those recommended for beriberi.

Infantile scurvy is a condition of great importance. There are cases in which the baby is very definitely sick. The more important group of scurvy cases are the babies who are not definitely sick. They teethe slowly, are slow about sitting alone and crawling. They seem weak in the back. More frequently than otherwise they are fat.

These are very mild cases of infantile scurvy. As in the case of beriberi, they need some change in their diet. Generally they need less fat and more starch. What is more important, they need orange juice, prune juice, perhaps lemon or lime iuice, perhaps some apple, and possibly some potato.

PREVENTION OF BERIBERI

The Japanese, in preparing for the war with Russia, decided that they would prevent preventable disease. They were a small nation; Russia was a large one. Preventable disease was four times as destructive as bullets. If they were to prevent preventable disease and the Russians were to follow precedents, their army would be as effective as an army four times as great. They would whip the Russians by preventing preventable disease—simple enough!

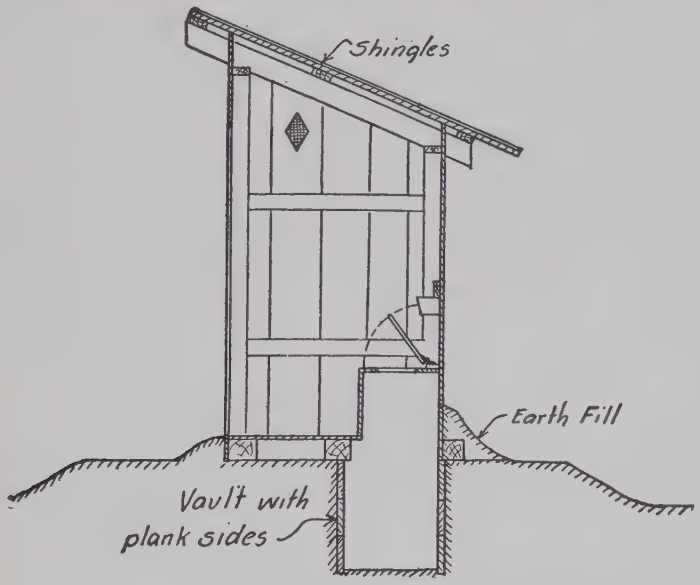


FIG. 78.—A GOOD CHEAP PRIVY.

They overlooked one disease; they classed beriberi as a nonpreventable. Ninety-seven thousand of their troops had this disease. As a sick soldier requires another soldier to wait on him, that meant nearly 200,000 troops made ineffective.

Beriberi is a baffling disease. It is an inflammation of the nerves. As a result of the nerve changes, the sick person has dropsy, becomes weak and eventually dies.

There is a little beriberi scattered around the United States, but not much. We never thought much about it until we became imperialistic. When we took over coolies and laborers of similar standards of life we took over beriberi.

We put our students to work on it at once. Those diseases of the other fellow, his wife and his children, interest us greatly. After beriberi we went with hammer and tongs.

It baffled the best specialists we had. Some said a bacillus caused it. Others said it was due to a monotonous diet of rice.

Each side could show that the other side was wrong, but it could not

show it was right. The bacteria advocates showed in turn that each chemical in rice was incapable by its presence or absence of causing the disease.

Now the rice group has won. That it has proved its position is generally accepted. *Beriberi is due to taking rice deprived of a delicate ferment present in the bran. It is caused, not by eating rice, but by eating polished rice. If the rice is not polished it can be fed indefinitely without harm, or, if a little bran is added, the harm is escaped.*

If beriberi subjects, in the early stages, are given a little of this bran, they recover from the disease. It has been proved many times on fowls, and is now being applied to men.

It is proposed to change the eating customs of the rice-eating people, at least to the extent of having them eat undermilled rice.

Why did the chemical escape the earlier analyses? They were for phosphorus, carbon, proteins, carbohydrates, and similar gross substances. Nobody thought of looking for this delicate ferment in the bran, and, besides, it was present in a minute homeopathic dose, a grain to a barrel or a similar laughable dilution.

Major Hess of the army tells us that the Japanese discipline was equal to their preparedness. It has been recently decided that they shall eat undermilled rice, and they will thus prevent the disablement of 97,000 of their troops.

CHAPTER XVII

Scurvy—Scrofula—Rickets

SCURVY

"In scurvy there is a swelling around the eyes over which the skin has the color of a bruise, and a pale face which looks bloated." There are rheumatic pains. The gums swell and the teeth become loose. The breath is about as offensive as after salivation. There is nosebleed and there is bleeding from the gums. The hemorrhage may be profuse. There are small hemorrhagic patches in the skin. Meanwhile the rheumatic symptoms become much worse.

Such is old-fashioned scurvy. Some of the soldiers of '61 remember it. Some sailors have seen it, but few of the ordinary run of people know this picture. Yet a large part of the population will have a "touch of scurvy" every year before May.

With some it will go no further than repeated spells of bad breath; with others a multitude of vague aches and pains variously called rheumatism, sciatica, lumbago, gout; with others there will be attacks of sore gums; with others the face will be pale and a little bloated, with dark circles and slight bloats around the eye; with others there will be patches of skin eruption.

To call these conditions scurvy is to exaggerate. To say they are touched with scurvy is perhaps as good as any way to put it.

Babies are prone to scurvy. The gums swell, become spongy and sore. Sometimes there is a soreness and swelling of the thighs. Barlow says: "Sometimes there develops a rather sudden swelling of one eyebrow, with puffiness and very slight staining of the upper lid."

With babies, as with grown children, a touch of scurvy is much more frequent than the fully developed disease.

An investigation of 134 epidemics of scurvy, going back 400 years, shows that the disease is one of winter and spring. In the ordinary forms of scurvy and near-scurvy it is also true that "spring is the proper season for scurvy and next to it would come winter." This is because of the weather as much as it is because of the difference between winter and summer foods.

One of the first men to write about scurvy, Lind, thought the wet and cold of the spring months were responsible for this disease. He put great stress upon the amount of the disease among common sailors, "whose clothes were frequently drenched and whose sleeping bunks were usually damp."

In 1795 *Blane drew up the English regulations for provisioning ships which won for the English navy the sobriquet of "lime suckers," but which also ended epidemic scurvy in that navy and indirectly brought the disease under control in the civilized world. Since that time there has been a universal opinion that the food of winter and spring has been the cause of scurvy in those seasons.*

Everybody is agreed with the opinion of Hirsch that in the causation of scurvy "diet is the alpha and omega." So far as scurvy in babies is concerned the opinion of the American Pediatric Society, rendered some twenty years ago, was that "the farther a food is removed in character from the natural food of a child the more likely its use is to be followed by the development of scurvy."

The above statements are true of touches of scurvy as well as of developed scurvy. After a person has been living on a meat and bread diet for several months and has developed a touch of scurvy it is necessary in order to cure him to go a little further in the dieting line than would have been necessary had the intent been to prevent alone. In other words, the diet must act as a cure as well as a preventive.

The consensus of opinion is that the vegetable acids and carbonates are the chemicals in vegetables and fruit which prevent scurvy.

Most of the diets put out as proper for certain diseases are without scientific basis. Here is one of the few exceptions. Scurvy, including touches of scurvy, is to be cured by diet and practically by diet alone.

A long while ago Hirsch printed the following as the grains per ounce of carbonate of potash in certain foods:

Large potatoes	1.875	Beef (salted)	0.394
Small potatoes	1.310	Onions	0.333
Lime juice	0.852	Wheat bread	0.258
Lemon juice	0.846	Cheese (Dutch)	0.230
Unripe oranges	0.675	Flour (best)	0.1
Mutton (cooked)	0.673	Oatmeal	0.054
Beef (raw)	0.599	Rice	0.1
Peas	0.529		

The best foods for scurvy, according to this list, are potatoes, lime juice, and lemon juice.

While we are not all agreed as to just what chemical does the work, there is a general agreement that it is some chemical found in fruits and fresh vegetables. Among fruits the best are lemons, oranges, and grapefruit, though all fruits are good. Among vegetables those heading the list are potatoes, watercress, cabbage, lettuce, and sauerkraut.

Of course, babies cannot go so far as sauerkraut. Usually they must stop with orange juice, prune juice, and perhaps some of the older ones can take lemon or lime juice.

Well-cooked potatoes may come along after the infant has been trained to digest starches, with oatmeal gruels and crackers.

Some of the old-time reports on vegetables and scurvy are interesting. Herr says that in the Army of the Potomac in the winter of 1862-63 there was much scurvy. Fresh vegetables could not be had at all. After a great deal of difficulty the soldiers got a small stock of potatoes and cabbages. The beneficial effect of even this small supply was marvelous.

In the siege of Paris in 1871 "it was when the supply of fresh vegetables, particularly of potatoes, failed that the disease broke out."

The amount of scurvy has greatly lessened in the last few centuries. Drawitz wrote in 1647:

"All mankind will soon be scurvied, for most children are conceived in scurvy and born with it."

In the sixteenth century vegetables were so few, Hirsch tells us, that when Catherine of Aragon, wife of Henry VIII, wanted a salad for her table she had to send her gardener to Holland to get it.

In that meat-eating age scurvy was rife, not directly because of the abundance of meat but indirectly because of the scarcity of vegetables and fruits.

It would be proper to say that the railroads cured the worst of the scurvy situation. Cold storage deserves about as much of the credit. Truck gardeners and fruit growers are entitled to their share.

However, those who read this volume are especially interested in the personal side. "How can I get through this winter and early spring without skin eruptions, rheumatic pains, puffy face, and the other signs of a touch of scurvy?"

The first requisite is to eat fruit for breakfast. Especially should the Southern people substitute fruit for some of the meat in their heavy biscuit-steak-waffles breakfast. Two fruits should be eaten each morning—one raw and one cooked.

The best raw fruits are oranges, limes, lemons, grapefruits, pineapples, and apples. In addition cooked apricots, apples, peaches, pears, baked apples, or other fruit should be eaten. As soon as the berries come in the spring scurvy goes out.

An excellent plan is to keep apples handy. A plate of well washed apples should be in the sitting room. Indoor workers will do well to eat at least one apple during the day and one before retiring at night.

If apples are not to be had there is a good substitute—the turnip. Every farmer can go into winter quarters with plenty of turnips. A nice raw turnip is about as palatable for most people as a raw apple. Raw turnip is no more apt to give stomachache than is a raw apple.

Winter is the season of the year when raw carrots are good for the complexion. A muddy complexion characterizes scurvy unless profuse hemorrhage has changed it to a ghastly color.

Raw carrots, by preventing and curing spring touches of scurvy, may prevent some muddiness, some puffiness, and may cure up some spring blotches.

An excellent preventive of scurvy, not in good standing with some people, is collards. This vegetable, sometimes called winter collards because it stands the cold well, is found in the gardens of most negroes in the South. It is worth a great deal to health that the winter-bound negro laborers, living on a narrow diet, can have a mess of collards, the great scurvy killer, once or twice a week.

Raw vegetables are better than cooked from the scurvy standpoint. There is some reason for thinking that there are ferments—delicate chemical substances—present in raw vegetables and essential for health, and that these are destroyed at the cooking temperature. Probably also the salts of vegetables are washed out in the cooking process, and these necessary substances are thrown away with the cooking water.

A good vegetable soup containing carrots, parsnips, potatoes, turnips,

okra, and onion is healthy. Above we gave the usual list of vegetables prescribed by physicians—potatoes, cress, cabbage, lettuce, and sauerkraut. To it we have added carrots, turnips, okra, parsnips, and collards.

We can also say a good word for greens of all sorts. Spinach is the most popular. It is easy to carry spinach in cold storage, and in consequence this top finds its way into market all through the winter.

Just as good are mustard, turnip, and beet greens. Asparagus, cauliflower, kohlrabi, and Brussels sprouts are in the same class with cabbage. Many people gain by making a soup of the water in which these vegetables have been cooked. Tomatoes and all other forms of tart vegetables and fruits are good means of warding off scurvy.

SCURVY, HOW TO KNOW IT AND WHAT TO DO ABOUT IT

Scurvy in babies develops when they are 10 *to* 14 *months old. Some younger and some older ones have it, but those are the months of greatest danger.* It will be noticed that this is just the time of life when the baby has been taken off fresh breast milk and has not yet got on a diet containing vegetables and fruits.

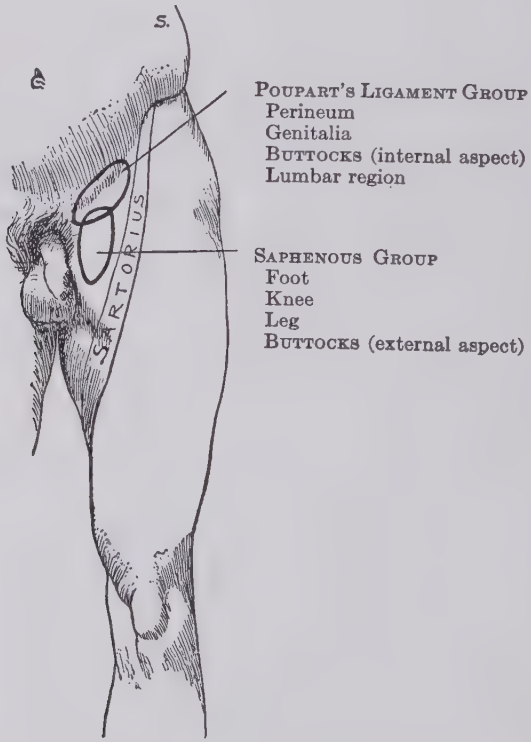


Fig. 79.—Diagram of the Gland Groups in the Groin and the Regions Which Should be Examined for Sources of Infection When These Glands are Enlarged.

The disease begins usually as follows: A fat but frail and flabby baby is feverish and fretful for a few days. Then it will be noticed that the child's limbs are so painful that it cries out when they are moved. The bones are swollen, sore, and tender. The skin over the areas of tender bone may be swollen and glossy.

The gums are boggy and painful. Some children thought to be "teething" have scurvy. There may be pin-point or pin-head hemorrhages in the skin or the lining of the mouth, or there may be bleeding from the gums, the nose, or the bowels.

In grown people the symptoms are about the same. I once saw a stone quarry worker brought into Dunning so pallid and orange tinted that he looked perniciously anemic. He suddenly bled like a consumptive with a hemorrhage—an extreme condition one seldom sees in our day.

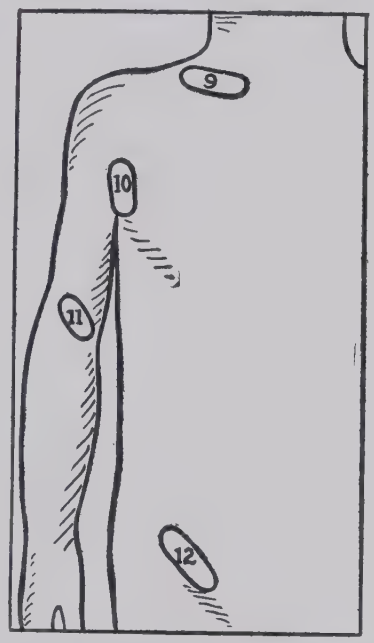


FIG. 80.—LOCATION OF LYMPH GLANDS WHICH FREQUENTLY ENLARGE.

The baby having scurvy must have fresh food. Orange juice, almost a necessity with city babies, becomes not almost but altogether a necessity when scurvy develops. Lemon juice, peach juice, apricot juice, prune juice are also good. Raw meat juice and a baked potato with plenty of good gravy are better than medicine out of a bottle.

A good doctor, anxious to do everything that should be done, will probably give the baby some iron and arsenic. *If scurvy develops in a baby fed on sterilized or pasteurized milk, it is wise to change to a high grade, clean, fresh, cold raw milk, and such milk in a large city means properly certified milk.* In the country or in smaller cities milk from a good cow kept on the lot fills the bill.

For the cure of scurvy in grown persons the principles of treatment are the same, more latitude, however, being allowable. For instance sauerkraut and beef tea are fine for grown people with scurvy, but not for babies. Three pints of good fresh milk contain as much citric acid as one ounce of lime juice, and therefore milk is good, and so are pickles and all sorts of fruit and vegetables.

Nansen prevented scurvy among his men by feeding them meats, dried fish, potatoes, and all sorts of dried and preserved vegetables and fruits, marmalade, condensed milk, preserved butter, and desiccated soups; as beverages they got tea, coffee, cocoa, beer, and lemonade.

Some explorers have escaped scurvy by eating all the rats available, and by feeding on fresh dog from time to time. When we are disposed to grow discontented with the results of the battle against disease it is reassuring to think of scurvy.

We read of the Crusades, and of how scurvy beat back expedition after expedition, or we come down to 1780, and read of how Admiral Geary's channel fleet was obliged to put back to England because 2,400 of the crew were down with scurvy. Let us compare this with the experiences of the present day. A family physician practicing among the average families in a town of fifteen or twenty thousand may go through his professional life without seeing a case of scurvy.

May Be Scurvy.—*J. B. J. writes: "What is the cause of the gums becoming sore, also bleeding, and the spaces between the teeth increasing? A dentist says this is not pyorrhea. I am 28 and have never had any trouble with my teeth before. The gums seem to be falling away from the teeth. What would you advise?"*

REPLY.—Assuming that your dentist is right and you have not pyorrhea, you may have scurvy or some form of poisoning, such as mercury, lead, or phosphorus. Your trade may help you to an opinion as to the trade poisoning. You may get lead poisoning from drinking charged waters.

Scurvy is the most likely of the group. Many people get moderately scurvied in winter.

SCROFULA

Strauss tells us that scrofula was so named because when the neck swells up in that disease it looks like the neck of a pig, and "scrofa" means pig. The Bureau of Animal Industry finds that practically every pig that has tuberculosis has enlarged glands in the neck. In most carcasses the tubercular glands in the neck are about the only evidence of tuberculosis in the body.

However, this relationship between scrofula and tuberculosis, and particularly between scrofula and the usual location of tuberculosis in pigs, is not the reason why the disease was called scrofula.

Another name for scrofula was "king's evil." The royal families were so frequently scrofulous in those early days that the disease came to be regarded as a morganatic hallmark of royalty.

We see that they were trying to hitch scrofula up with all sorts of relations because they did not know of the real relation of scrofula to tuberculosis. About 100 years ago it first began to occur to scientists that scrofula and tuberculosis were the same disease, but the information in hand was so slight and the methods of examination so crude that the men who tried to find out if the two diseases were one came to the conclusion that they were not.

About half a century ago Villemin proved that scrofula was tuberculosis, but the proof was but slowly accepted. Even Virchow, the master medical mind of his day, rejected Villemin's proof for a long time.

Practically everybody now agrees with the view expressed by Osler that scrofula is not a disease of itself but only a special form of tuberculosis peculiar to children.

In Strauss' history of the controversy over scrofula and tuberculosis we find many points touched upon that are now in the limelight as parts of the Friedmann plan of cure.

Scrofula, meaning piglike, has some new claims to accuracy. Like pigs,

children get it by "following" cows; the tubercle bacilli are swallowed with the food, and the food usually eaten raw is milk. They are absorbed and go into the blood. The lymph glands filter them out. The blood is saved, but the lymph glands are badly punished, in fact may die. The bacilli may never get into the system. Sometimes they get by and set up an ordinary consumption.

Behring and Harbitz think a great deal of the consumption is due to bacilli that have escaped from the glands. Other authorities do not give this route of infection so much prominence.

In scrofula, in addition to the enlargement of the glands of the neck, there is trouble in the mouth, nose, and throat. A distinguished Frenchman, Velpean, once wrote:

"The patients, even the physicians, get engrossed with the swelling in the neck and forget the conditions in the mouth, tonsils, teeth, nose, and throat which lie back of the neck condition."

This is as true today as it was when Velpean wrote it.

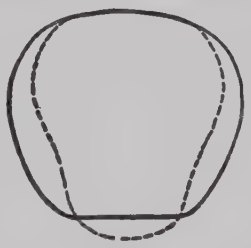


FIG. 81.—SHAPE OF THE SCULL IN RICKETTS.

Scrofula is not what it used to be. The old, eternally running sinuses are seldom seen. Such neglect would not be tolerated now. Their day ended when Fenger taught surgeons to dissect away carefully every bit of tubercular gland in the neck.

At the present day cases are seldom neglected badly enough to make the Fenger operation necessary. Many of them are stopped now before any operation is necessary. Those that need operation seldom need the more radical operation.

Having come so far, we should go a step farther and cease using tubercular milk.

RICKETS

Once upon a time one physician—a children's specialist—went through the wards of a municipal hospital closely examining the children. He found that 70 per cent of the children showed signs of rickets. A few days later another children's specialist went over the same lot of children and found only 5 per cent of them showed signs of rickets.

A well-developed case of rickets no physician would fail to discover, but there are signs of rickets which might be overlooked by anyone, and others about which one person would hold one opinion and another person another. For medicine differs not from law or business or weather prognostications in that in all of them, as in everything else, men differ.

A physician who cannot diagnose diphtheria until the patient chokes, or typhoid until flies crawl over the eyes, or smallpox until the smallpox odor develops, is not much of a doctor, certainly is not worth his pay. And it is with rickets much as it is with other diseases—the serviceable time to find it is when it is beginning.

This is less true of rickets than of most diseases. Neglect does harm, but the harm can often be remedied. For instance, rickets is the cause of

bowlegs. There is not one bowlegged grown person for every five bowlegged children. Why? The legs have got straight. Ridlou says this statement is not true.

Unless the bone changes in a case of rickets are bad, they will clean up if the conditions which caused them are removed. Therefore a mother who notices that the baby is bowlegged or pigeon breasted need not be downhearted. With a little intelligent direction and proper attention on her part the conditions will disappear.

I think that we have all noticed that bony deformities are less often seen than formerly. Amongst the young we seldom see badly twisted spines and legs badly bent. Stiff joints and hunchback should disappear in another generation, and as they go into the discard bowlegs, pigeon breast, rosary chest, the ricket-caused group, should lead the way.

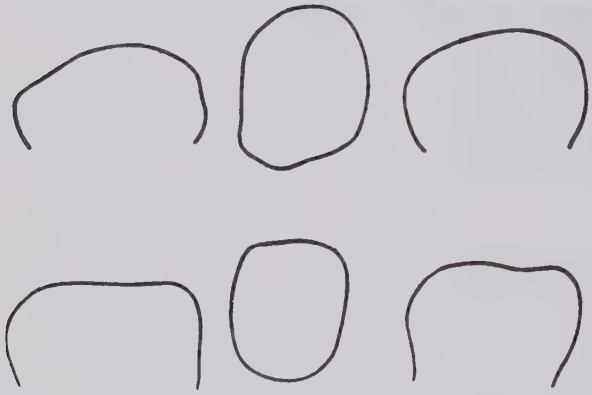


Fig. 82.—Cranial Contours (comparative)—Anteroposterior—Circumference—Transverse. The upper figure represents the hydrocephalic head and the lower figure represents the rachitic head.

The bones of a child contain much cartilage and little lime. As lime stiffens the bones the child learns to use its limbs for walking. The two processes go hand in hand. Wise nature keeps either from getting ahead of the other. Not so in rickets, where the cartilage part of the bone continues to grow, in fact overgrows, but the deposit of lime salts does not keep pace. Thereupon the bones become like what we know commercially as whalebone, in that they bend in whatever direction any force drives them. The legs bow, and the arms would bow, too, if the child tried to stand on them. In fact, they do bow in four-legged animals suffering from rickets.

The ribs take on unnatural curves, curves that make the lungs more subject to consumption, and in the thumb-sucking child the palate arches up and the teeth are thrown out of line.

HOW TO KNOW RICKETS AND WHAT TO DO FOR IT

A good sign is that the baby does not teethe right. Sometimes the teeth come too early; usually they come too late. When they come they crumble easily. *If the year-old baby has no teeth or if teething starts and then no teeth come for several months the baby is rickety.*

Sweating of the head is a suggestive sign. If a mother notices that the baby's pillow is soaked with sweat she should look closely for other evidences of rickets.

Another sign is marked slowness in walking, particularly if the baby has been nursed by a badly run-down mother or has been eating condensed milk or cereals.

That he is fat is no sign that he is free from rickets. On the other hand, fat, fine-looking babies are frequently rickety, particularly when they are soft and flabby looking.

The very foods which fatten babies —sugared condensed milk, cereals, sweets —also cause rickets. These out-of-balance foods sometimes cause overfatness, sometimes rickets, and sometimes both conditions, side by side, in the same baby.

Following much the same mental process as the mother does when she thinks her fat baby is a healthy one, she thinks a sweaty forehead means only that her baby is fat—when it really means rickets.

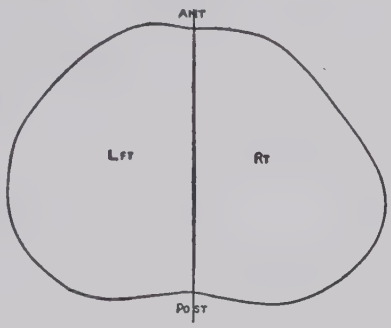


FIG. 83.—"PIGEON CHEST."

A rickety baby is liable to have a Daniel Webster head. A broad, overshadowing forehead with a flat top may mean hydrocephalus, or water on the brain, or one or two other congenital conditions. Nine times out of ten a large, square forehead in a baby means rickets. The head sign of rickets most frequently found is a slow-closing fontanel. Instead of being ¾x1

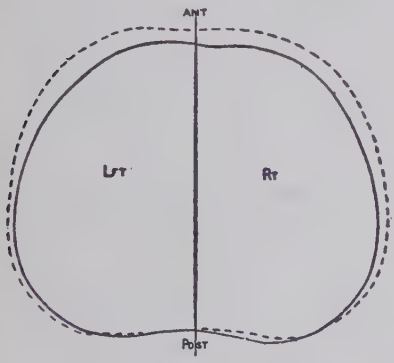


FIG. 84.—ROUND TYPE OF CHEST. Incipient disease in right side.

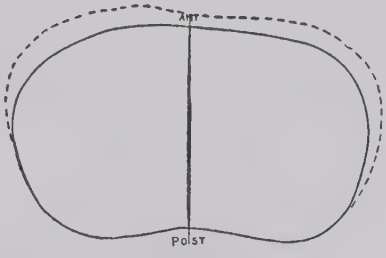


FIG. 85.—FLAT TYPE OF CHEST. Expansion in one year, coincident with marked improvement.

inch at one year of age, it measures 1x2 inches. Instead of closing at eighteen months, it does not close for two or three years.

"Pot belly" is a rickets sign. So is peevishness, a mental irritability not otherwise explainable. Generally speaking, these are early signs and the mother who is shrewd enough to find them and change the baby's feeding in time never sees the development of bony deformity. Otherwise, presently the baby is found to be bowlegged or, what is of much greater importance, the baby, instead of being barrel-chested, is pigeon-breasted; or else, by the

side of the breastbone, and about one inch away on each side, there is a row of beady knobs. Or the skull becomes irregular and distorted, the forehead large and square, and thin places appear here and thick ones there.

While the legs usually bow out, they are liable to twist in any direction.

A baby found to be rickety should go under medical direction. Not that medicine does much good, for, while phosphorous preparations help and symptomatic treatment is called for, the main things to do are hygienic. The indications are, change of milk—to get it purer and richer; drop some starch and sugar out of the diet; to bring about better home conditions. These are the things that need to be done—and that means medical direction. Going first to one doctor for a bottle of medicine, and then to another for some powders is not medical direction.

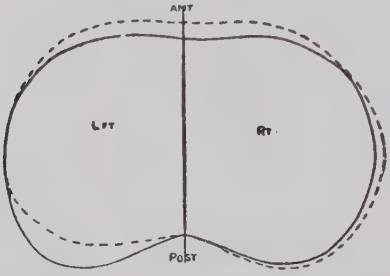


FIG. 86.—BULGING BACKWARD ON ACCOUNT OF SCOLIOSIS. Correction of scoliosis.

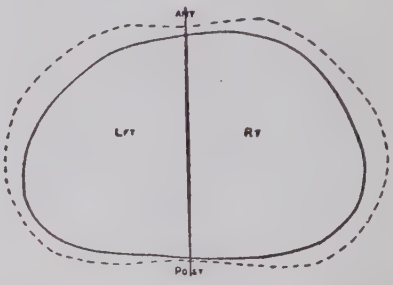


FIG. 87.—MARKED SHRINKAGE OF LEFT LUNG, DUE TO POSTPNEUMONIC EMPHYSEMA. Restoration of normal perimeter in three months by exercises.

Cause of Rickets.—*M. E. T. writes: "What is the cause of rickets? How can rickets be prevented? What are the symptoms? What is the cause and what are the symptoms of infantile scurvy?*

REPLY.—1. Rickets may be caused by one of several things. It may be caused by several things operating together, and usually is. The cause that

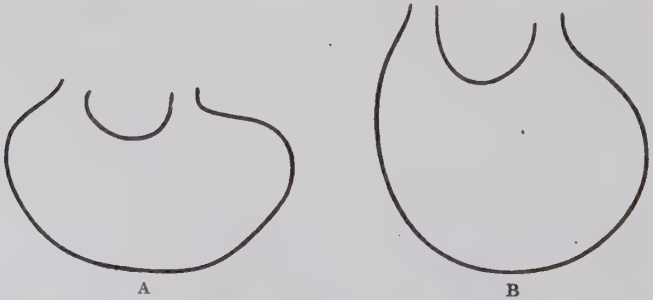


FIG. 88.—A. NEARLY NORMAL STOMACH. B. DILATED STOMACH. A condition frequently found in rickets.

overshadows all others, however, is poor food. The usual fault with the food is that it contains too much sugar and starch and not enough fat. In other words, the child gets too little cream and too much cereal and

bread. Other causes are overheated and overcrowded living and sleeping rooms, dark rooms, rooms opening out on dark and dirty alleys, poorly constructed and ill-ventilated apartments, basements, and the like. Sometimes the mother must work and the baby must be left with children who feed it mildly spoiled milk, watery milk, too much cereal.

2. By correcting such conditions as named above.

3. Scurvy is caused by eating too much stale food and not enough fresh food, especially good fresh milk and fruit juice. Older children suffer from scurvy when they do not get vegetables and fruit. The symptoms are about as follows: The baby is feverish and fretful for a few days. Then it will be noticed that the child cries out when its limbs are moved. Examination shows the bones to be swollen, sore, and tender. The skin over these areas is swollen and glassy. The gums are boggy and painful. There may be hemorrhages in the skin or lining of the mouth. There may be bleeding from the gums, the nose, or the bowels.

FIG. 89.—SHAPE OF HEAD IN RICKETS.

Child Has Rickets.—*C. A. M. writes: "Our boy, 19 months old, was born with a slight curve in the lower part of his limbs. This was barely noticeable, however, until he started to creep, or hitch, and this doubled one leg under the other, so that, after four months, one leg is badly curved. He has been walking for two weeks and both limbs curve outward at the knee. He has some stomach trouble and is rather nervous. We have given him for the last year almost entirely malted milk, which agrees with him. Cows' milk is tabooed, as he cannot digest it; also it causes constipation. Aside from the legs he is perfect physically and is plump. What would you advise in regard to the limbs?"*

REPLY.—You should take the boy to a children's specialist. He is rickety, and probably has been for months. That he has not walked until nearly 19 months old suggests rickets; that his bones are so soft that they bend under pressure proves it; that he is "perfect physically and plump" (except for the curves in his bones) does not disprove it. Babies that get a good deal of starch and sugar are apt to be plump and rickety. Certainly the child has indigestion, which is partly responsible for the rickets.

Not Much Difference.—*Mrs. L. A. R. writes: "From the viewpoint of the mother's regaining strength and of the child's well-being, which is the best time of year for a child to be born? Will you also tell me if a child ever inherits a tendency to rickets?"*

REPLY.—1. I have read several discussions of the subject. They have been based on average weights and rate of growth of a large number of children. It has not seemed to me that there was much difference. Spring babies are pretty certain to be at the breast the first summer and with trained stomachs during the third. So they have but one cow's milk summer. Therefore they are less liable to the baby's greatest hazard, summer complaint.

2. Yes. Some children are born with rickets. Some are born with a disposition toward it.

Treatment of Rickets.—*J. A. V. writes: "Please tell me the best treatment for a child 17 months old who has symptoms of rickets."*

Reply.—Vegetables, fresh food, fresh rich milk. However, if your child shows signs that you think mean rickets have your physician see it, make certain of the diagnosis, find out where the regimen has been wrong and tell you what to change.

Might Be Rickets.—*Mrs. J. E. A. writes: "My grandson, 4 years old, sweats dreadfully, even on cold nights. Sleeps in a gown only and in room*

Fig. 90.—Bowlegs.

Fig. 91.—Knock Knees.

with open doors and windows. In half an hour after going to bed his pillow will be perfectly wet, or even the mattress, without a pillow. His parents are perfectly healthy, and he is well, though he has a delicate look. He is not a strong child. Can you suggest the probable cause and a remedy?"

Reply.—When a young child sweats profusely at night, especially if the pillow is made wet, one thinks of rickets. Is he bowlegged? Has he digestive disturbance? The cure for rickets is fresh air and sunshine, a diet rich in meat, meat juice, butter, fruit, and vegetables, proper attention to diet, cold baths, followed by brisk rubbing and iron tonics. Have your physician decide whether he is rickety or scurvied.

Curvature of the Spine.—*E. S. writes: "1. Does curvature of the spine follow as a result of English disease? 2. Can a woman who has had both ever have children?"*

Reply.—1. English disease is a name sometimes given to rickets. In a bad case of rickets the spine may curve. Bowlegs is a curving of the leg bones due to rickets. Pigeon breast and rosary chest are conditions resulting from unnatural curving of the ribs from rickets. Some years ago I saw spinal curving in some Lincoln park baby animals resulting from

rickets. However, little spinal curvature is due to rickets, certainly not 1 per cent. The usual cause is bone tuberculosis.

2. Women with spinal curvature, women who have had rickets, and women who have both conditions can conceive. Whether or not they should is dependent upon how strong and vigorous they are and how great the deformity is. The deformity is no bar to bearing children, provided the lower half of the trunk is roomy enough. That point should be decided on by good medical advice.

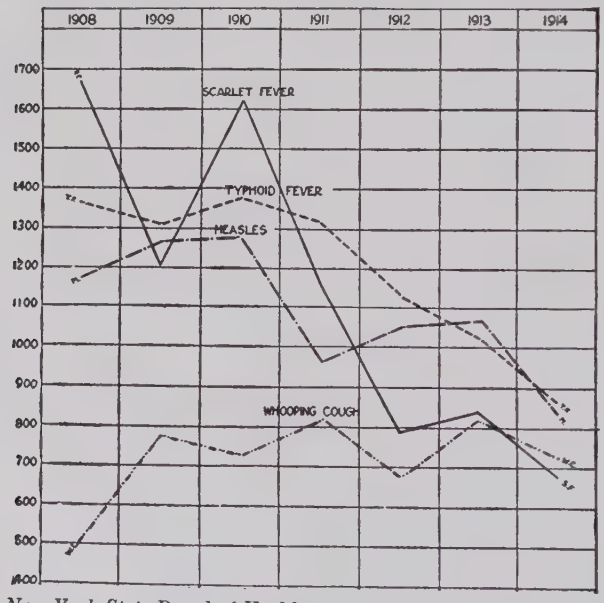
CHAPTER XVIII

Contagion—Disinfection

Time was when epidemics of contagious disease were charged to the wrath of God. Others thought they were due to devils. This was followed by the age in which epidemics were recognized as the material results of material forces acting in a material way. But the opinion and procedure even of that day were tinctured with mysticism.

CONTAGION AND INFECTION

The older dictionaries gave quite elaborate and finespun differences between these two groups of diseases. They went further and classified communicable diseases into the two groups. The later dictionaries have thrown those old classifications into the wastebasket. I hope the people have done the same. There are only a few of these communicable diseases and there is no particular trouble in remembering how each is communicated. Trying to classify them will not help any.



New York State Board of Health.

FIG. 92.—DECREASE OF CONTAGIOUS DISEASES IN NEW YORK STATE.

Smallpox is spread by persons ill with smallpox or just recovered from it. The rule is to isolate the smallpox patient and for every person to keep away from him. A person properly vaccinated is permitted to violate this rule.

Chickenpox is spread by persons who have or very recently have had the disease.

Diphtheria is spread by persons who are ill with diphtheria or who

have ordinary sore throat due to the diphtheria bacillus or whose throats harbor diphtheria, but who are not sick. The rule is to isolate not only those with diphtheritic membranes in their throats, but all who have diphtheria bacilli in their throats.

Scarlet fever is spread by those who have the disease typically or atypically. As we do not know the germ of scarlet fever, a good deal of uncertainty prevails as to how long the disease is contagious. The shrewdest guess is that it is contagious as long as the throat is sore or the tonsils are swollen and boggy. The rule is to isolate the patient whether he is seriously ill or is not seriously ill.

Measles is spread by those who have the disease. We must not forget that the disease starts when the fever, aching, and cough begins. The eruption is merely an incident. Some patients do not have it at all. The rule is to isolate and to begin the isolation early. In measles times every child with a fever, cough, and watery eyes should be isolated. If the disease turns out to be an ordinary cold not much has been lost. On the other hand, measles is most contagious before the breaking out appears.

Typhoid fever is spread by those who have the disease and by carriers. We know a lot about the typhoid germ. Unlike some of the others it can be carried long distances. It can get on a fly and be carried a few blocks (by the wind) or a thousand miles (by a railroad car). It can get in milk and be carried as far as milk is carried. Regardless of how far it is carried the trail started with a man who had the disease.

The rule is to isolate, not absolutely but partially, to keep flies away from the patient and from his excretions, to see that no food, outside of the food for the patient, is prepared by the attendants or in the neighborhood of the sick man; to allow as many visitors as the patient cares to see or his doctor will let him see, but the visitors must be careful of their fingers.

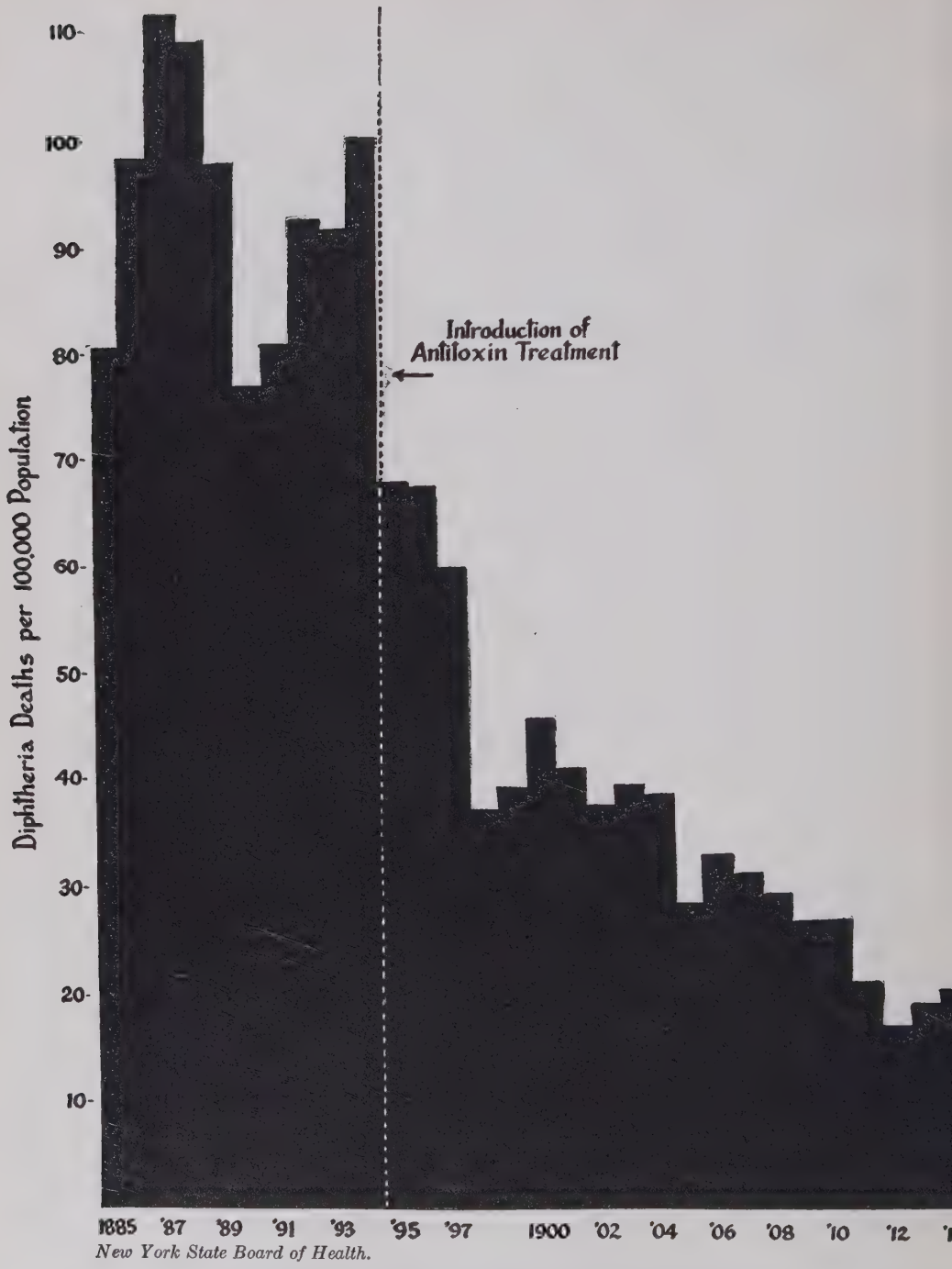
ON REPORTING CONTAGIOUS DISEASES

Contagious diseases are preventable. They cannot be prevented after they have occurred, though a lot of people mistakenly think so. When a physician is called in at the onset of typhoid fever or scarlatina he is often asked, "Can't you give some medicine to stop it?" *Once a disease, particularly a contagious disease, has set in, it will run its course.* It will not only run its course, but it will infect others and cause the same disease in them—unless its spread is checked.

Before anything can be done to stop the spread of contagious diseases the health authorities must know where the cases now existing are. Without such knowledge nothing can be done.

The city ordinances require that the physician in attendance, parent, guardian, or the owner of the house where such a case exists, shall report same to the health department. This is to be done just as soon as the diagnosis is made, by telephone, and within twenty-four hours in writing.

The following diseases are to be thus reported: smallpox, diphtheria, scarlet fever, typhoid fever, tuberculosis, measles, whooping cough, chicken pox, infantile paralysis, meningitis, erysipelas, typhus, pneumonia, mumps



New York State Board of Health.

FIG. 93.—THE DECLINE IN DIPHTHERIA IN NEW YORK STATE.

and any other disease of a contagious character. The penalty for not reporting cases of contagious diseases to the proper authorities is from $10 to $200.

The prime importance of reporting contagious diseases was recognized and enforced by legal enactment many years ago, even before their contagious character was scientifically proven. In 1782 a law was passed in Naples fining any physician 300 ducats for the first offense, in a case of consumption. If the offense was repeated he was to be banished from the country for ten years. About the same time similar laws were passed in Spain and Portugal, making failure to report such cases on the part of physician or family punishable by fine and imprisonment.

If all cases of contagious diseases occurring were reported the matter would not need to be written about. The fact is that many of the most serious cases of diphtheria, scarlet fever, consumption, and typhoid go unreported. Of the milder contagions, such as measles, whooping cough, chicken pox, and mumps, probably not more than one-fourth are reported.

The harm done by the unreported cases is incalculable. Each case not reported and not properly cared for is the starting point for several other cases. Much illness and many deaths are due to this one factor. Most doctors do their duty in this respect—all of them would like to do it.

The discharge from the family's service of an able, honest physician for no other reason than that of having reported a case of contagious disease in the family is an everyday occurrence. A less dutiful and usually a less able physician is called in.

We know of many physicians who have gained notoriety and patronage because of the fact that they do not report cases of contagious diseases. The inconvenience of quarantine in most cases and perhaps some interference with business in others constitute the objection on the part of narrow-minded, ignorant people to having cases occurring in their families reported. Thus they sow the wind, and the community reaps the whirlwind.

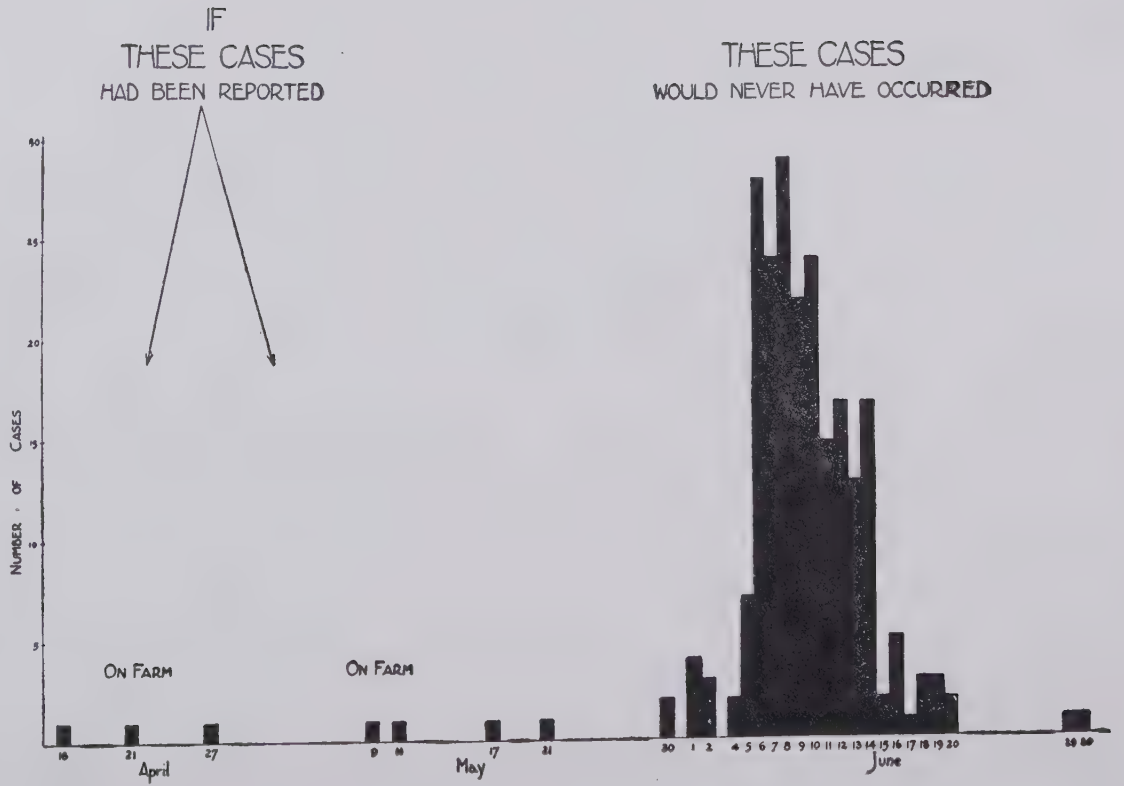
Stringent application of existing ordinances, sufficient hospitalization facilities for all contagious diseases, and the education of the public are the remedies.

CONTROL OF CONTAGION IN SMALL TOWNS AND COUNTRY

In large cities, measles, diphtheria, and scarlet fever are present all the time, and smallpox more than half the time. Small cities and country communities will go for a year or more without a case of these diseases, and then comes a sweeping epidemic. Therefore, the science of fighting contagion in the city is one thing, that of fighting it in the country is another.

This coming and going, this intermittence, is the quality which makes it easy to control contagion in the country, when the community takes an interest in the welfare of its people.

Closing schools, with all its expensive waste, is a procedure that they have abandoned; communities paralyzed in a business way by epidemics are something which they remember but no longer tolerate. The meningitis experience through which Texas has just passed might have occurred in



New York State Board of Health.

FIG. 94.—THE HARM FROM NOT REPORTING CONTAGION.

England a few years ago, but not now. In Germany and England travelers, pleasure and health seekers, and business men no longer shun great districts because of fear of uncontrolled epidemics.

A country epidemic commonly begins with a case which seems to have dropped down like lightning out of a clear sky. We shall take diphtheria as an illustration.

When a case appears inexplainably, those who argue that diphtheria can spring up spontaneously can make out a pretty good case (the believers in spontaneous generation are not all dead yet).

Occasionally this first case will occur among people who are not very clean, and those who believe that diphtheria is a filth disease find support for their position.

Both are wrong and fairly careful detective work will usually prove it. Occasionally, English health journals print accounts of diphtheria in rural England which show how careful detective work has marked out the train of the itinerant carrier of mild diphtheria, called sore throat. The New York authorities were able to follow the typhoid trail of one woman, and she not sick, over much of New England.

In this way the Chicago Health Department trailed a typhoid carrier, by cases that formerly would have been called sporadic, from Chicago to Gray's Lake (Illinois) and back again to Chicago.

Now, when a case of diphtheria, scarlet fever, or measles breaks out in Watseka, Illinois, or What Cheer, Iowa, it is because somebody who carries contagion has been in town recently. At the very earliest, ten days or two weeks elapses from the time the spreader arrives until the first case is diagnosed. In that ten days, the spreader may have moved on. Therefore, the connection will not stand out plain and easy to see.

However, if careful inquiry is made, the sick child can usually locate the harming contact as lying between a small number of people—say five. She will remember some person with some suspicious sign.

Inquiry into the medical history of these, clinical examinations of their throats and skins will generally identify the carrier or a typical case, or will bring out information of a recent exposure of someone who was "a little sick," or had a "little sore throat," or a "cold," or a "stomach rash."

Now, small towns and country schools should have no diphtheria, scarlet fever, or measles—ever. For years to come Chicago must have them always—there is no escape. But not so Pontiac, Illinois, or Edgerton, Wisconsin.

A few places such as Valparaiso, Indiana, Summit, Illinois, and La Crosse, Wisconsin, have seen what they can do to give security to their people and increase the intervals between epidemics until such time as they can wholly eliminate them.

How are these intervals to be made longer and the disease finally eliminated?

First, there must be a central health authority, a health officer who knows some rudiments of epidemiology. Where this is not a workable condition, the school principal is an intelligent agent, clearly in touch with the common channels for the spread of infection—the children—and, through them, in a position to know of conditions in the homes. He can be of great service pending a public demand for a special trained health officer.

Second, cases suspected of being contagious must be reported at once.

Third, isolation or quarantine must be made as little burdensome as possible.

Fourth, through the health officers, school teachers, and principals carriers of infection must be located and controlled at once.

Fifth, school inspection must be inaugurated and continued until the focus has been stamped out.

This plan is much cheaper and much more effective than the present plan. In essence, it consists in early and quick action—nipping the weed in the bud, and then following down the stem to the root and digging that up, the plan which has been found necessary with Johnson's grass.

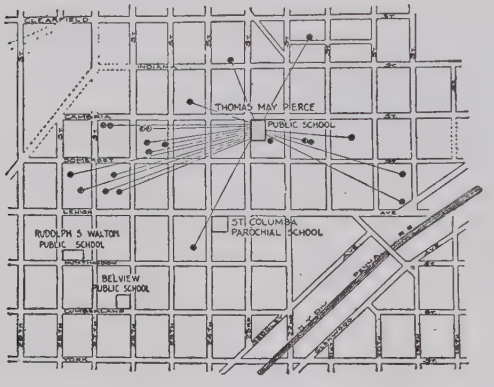


FIG. 95.—HOW ONE SCHOOL SPREAD SCARLET FEVER.

The method which it is suggested that this supersede is about as follows: A case of scarlet fever breaks out in a family. The well children continue at school. Presently a second case occurs, and the neighborhood begins to talk a little about scarlet fever being in town. In two weeks, the third crop of cases breaks out, and the neighborhood is getting badly frightened.

Ten days later, new cases are developing every day. There are no longer crops of cases. New cases are appearing here and there, the disease is no longer sticking closely to neighborhoods.

The local authorities call a public meeting; the state board of health is called in; guards are employed; schools are closed; the teachers get a vacation with pay; the town is badly upset; the country around is afraid to come to town to trade; business is at a standstill.

About this time the community is thoroughly awakened, and the epidemic speedily dies out.

It is always easy to control an epidemic in the country or a small town when effort is made.

This plan—letting the fire burn until it gets to the business district—is effective enough, but it is too expensive. Ten dollars spent on the first case will accomplish as much as a thousand spent to care for a situation after it is bad.

Another bad result from letting the first cases drift is that the contagion always spreads to neighboring towns. When smallpox traveled from a Wisconsin town to a farmhouse northeast of Marengo, Illinois, it was reasonably certain to get to Marengo. When it reached there, it was reasonably certain that some cases would occur along the country roads leading from the infected town, even though the farmers' wives and children kept out of town, and the farmers hauled their milk to the factory and left for home without going uptown to the stores.

ONSET AND INCUBATION

The incubation period is the time that elapses between exposure to contagion and the development of a disease. In the season of epidemics many people keep asking how long it will be after a case of contagion has been taken out of an office until those in the office may judge that they are safe.

During this incubation period those who are due to get sick are carrying the germs somewhere in their bodies, though what is happening to either the germs or to the hosts is not known.

The incubation periods of some of the more important diseases are as follows:

(The figures in brackets are those furnished by Cornell, the others are by Hill.)

Acute sore throat	2 [1 to 3] days
Diphtheria	3 [1 to 10] days
Scarlet fever	4 [2 to 7] days
Measles	10 [7 to 18] days
German measles	14 [14 to 20] days
Chicken pox	16 [10 to 18] days
Smallpox	12 [10 to 20] days
Mumps	16 [14 to 20] days
Whooping cough	8 [7 to 10] days
Tuberculosis	Indefinite

The first figure given is the number of days that elapse between exposure and illness in the average case. But disease does not always run on schedule; sometimes it rolls in a day or two early, and sometimes a day or two late.

The figures in brackets indicate the ordinary limits of these variations.

If a case develops after a shorter interval than the minimum given, the probability is that there was a prior, though unrecognized, exposure; if later, that there was some other focus of infection.

In this connection, it is well to know that some of these diseases are infectious during the period of incubation; for instance, a man with diphtheria has been infectious since the day he became infected, through his three days of incubation as well as through his days of sore throat.

All forms of contagion begin with fever and general aching. In measles, scarlet fever, and diphtheria there is sore throat in the early stages, about as early as the fever.

Therefore, in the season of epidemics, a sore throat, fever, and aching should put one on his guard.

The attack may be nothing more than a cold or a simple sore throat, but it is fairer to the office and fairer to oneself to go home with the first oncoming of the aching and there await a decision as to what the illness is going to be.

Both measles and scarlet fever break out in the mouth before they

break out on the skin, and diphtheria usually shows a membrane on the throat and never, or rarely, any skin eruption.

Therefore, when this group of contagious diseases is suspected, the mouth is to be watched.

Smallpox is characterized by a violent aching and high fever, persisting for three days. Up to this point almost anybody would be liable to confound smallpox with nearly any fever. Then comes the turn that distinguishes the disease—the fever drops, the aching ceases, and the eruption appears.

DANGER FROM PETS

The Montana Board of Health has issued a bulletin warning people against close association with pets. Nobody has arisen to warn animals against close association with people.

Cy De Vry, in his lecture about the wild animals he has known, states that the food of the Lincoln Park (Chicago) animals is better inspected, in fact, averages better, than the food of the people. Anyone who knows Lincoln Park or who sees Mr. De Vry's pictures will know that the animals live in more sanitary homes.

North Carolina Health Bulletin.

FIG 96.

Why is it, then, that they sometimes get consumption? Associating with the people.

Having given the animals their day in court, we repeat what the Montana authorities tell us.

Dogs, cats, and parrots can pick up ordinary contagion from those sick with contagion, such as diphtheria, and then give it to others. The teaching is that when a child is sick with contagion the animal pets should be excluded from the room until quarantine is terminated, for a dog cannot be fumigated. The further advice is given that kissing dogs, cats, and parrots is liable to spread contagion.

Animal pets have tapeworms which are frequently spread to man by close contact. A tapeworm requires two hosts, in each of which it passes a different cycle. The worms, which are rather mild tapeworms in the dog, pass through a much more harmful stage in man.

The hydatid disease in man is due to the man cycle of a lower animal tapeworm.

There are several varieties of these worms. I have often written that a tapeworm in a man's intestine is of no great consequence. A hog tapeworm or a dog tapeworm in a man's tissue is of great consequence.

Itch is not nice to think about even when one thinks of catching it from his barber or his friend. It is worse to think of getting itch from a dog. Dogs and cats have several kinds of itch, each capable of transmission to man.

When plague threatens, pets become of increased importance, for this disease is spread by a flea, which, while it prefers the rat, is willing to take up temporary residence on any domestic animal.

Hydrophobia would die out if it were not kept going by the lower animals, and especially by dogs.

So far as consumption is concerned, the lower animals both sin and are sinned against. The dog that pines for its master who is slowly going down with consumption is slowly dying from consumption contracted from him. On the other hand, some cases of human tuberculosis that seem to come out of a clear sky have come from a dog or cat.

Finally, there is anthrax, a terrible disease in lower animals, capable of causing a terrible disease in man. In fact, one of the names for human anthrax is "wool sorters' disease." It is so named because men who handle wool and hides get it from what they work in.

Human beings are not subject to lumpy jaw. If they were they would catch it often from animals. Occasionally glanders is contracted from a pet horse.

EASY TO CONTROL CONTAGION

In September, 1910, in East St. Louis, the Board of Education placed drinking fountains on the boys' side of the Horace Mann School. On the girls' side the public drinking cup was continued. The record for the session of 1911 shows 110 per cent more contagion amongst the girls than amongst the boys. In October, 1911, drinking fountains were installed on the girls' side. From that date to February 1, 1912, the records show this excess of 110 per cent has dropped to 20 per cent.

It is not often that we can observe two groups of people so nearly parallel as these, and therefore the experience in East St. Louis is unusually convincing.

Contagion is spread in more ways than by drinking cups used in common, and to abolish that nuisance will decrease but not end contagion. Yet here we have a good illustration of what can be accomplished by even a halfway measure.

Hill tells us that in controlling contagion 100 per cent efficiency of method, while desirable, may not be required; 50 per cent efficiency has often proven effective. Anyone who has had any experience with the rule of thumb, unscientific methods of health department work in the old days, knows that Hill knew what he was talking about. He has spent many years in controlling epidemics and he should know.

What is the reason? In the first place very few of the bacteria thrown off by those infected survive for even an hour. They are killed by sunlight, by drying, by other bacteria, by numerous agents. It is a general law that bacteria capable of producing disease in man do not thrive outside the bodies of man or other animals. On the other hand but a small percentage of the people who come in contact with contagion are affected by it. Most people are immune. Some immunity is natural. Most of it is acquired.

If 100 babies are exposed to smallpox at least 95 will contract the

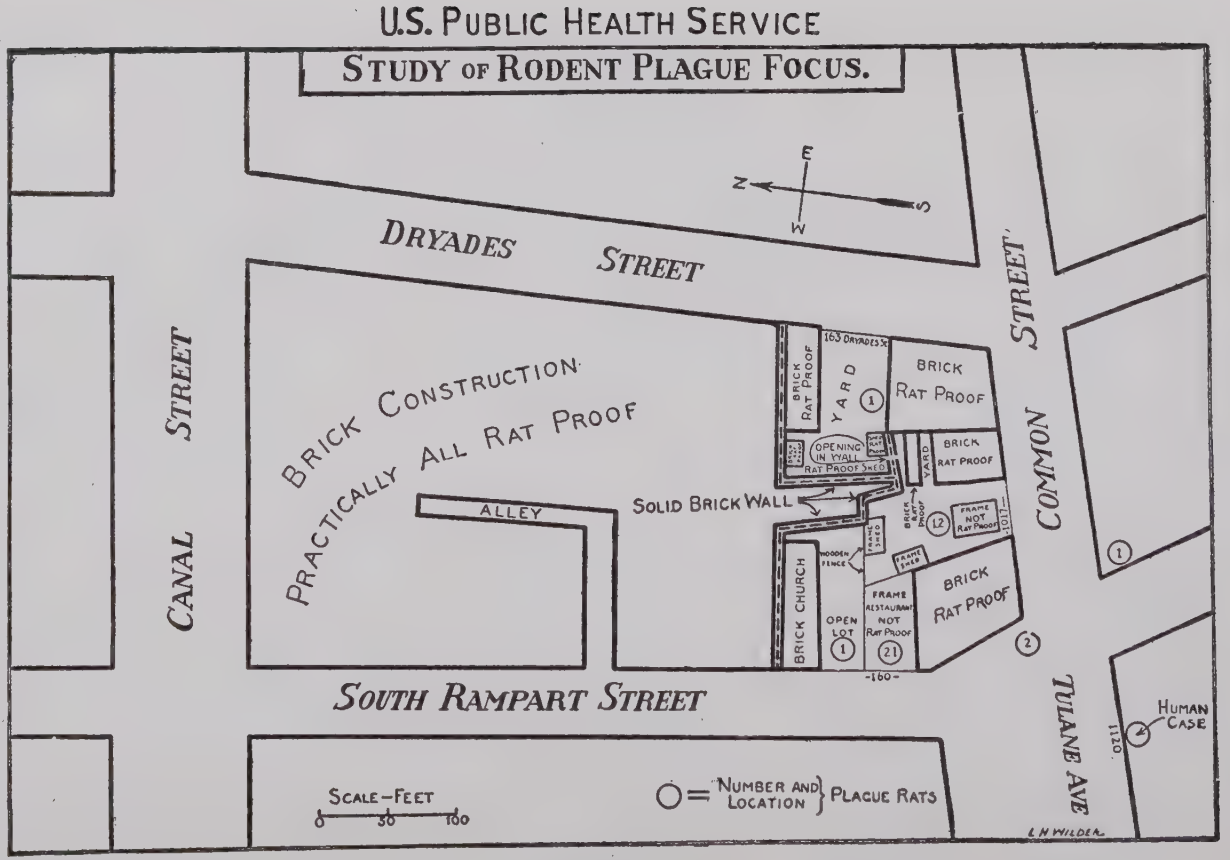

U.S. PUBLIC HEALTH SERVICE
STUDY OF RODENT PLAGUE FOCUS.
DRYADES STREET
CANAL STREET
COMMON STREET
TULANE AVE
SOUTH RAMPART STREET
ALLEY
BRICK CONSTRUCTION
PRACTICALLY ALL RAT PROOF
SOLID BRICK WALL
BRICK CHURCH
OPEN LOT
FRAME RESTAURANT NOT RAT PROOF
BRICK RAT PROOF
FRAME NOT RAT PROOF
YARD
OPENING IN WALL
WOODEN FENCE
HUMAN CASE
1120
-160-
SCALE-FEET
0 50 100
= NUMBER AND LOCATION } PLAGUE RATS
L.H. WILDER

FIG. 97.

disease. But as most of the grown people have been vaccinated one or more times, if 100 adults are exposed not over 5 would get it.

Or take measles. Expose 100 small children to measles and 95 would get sick. On the other hand 90 out of every 100 grown people have had measles and will not take it again. Change the proportions somewhat and you have the scarlet fever situation. Only about half the people are susceptible to diphtheria at any time of their lives.

The great majority of people will not contract consumption from casual contact with a consumptive and a large proportion of them are not endangered by close contact with one.

Most people are not in any danger of developing pneumonia from breathing pneumococci. The coccus does not seem to have that power for them.

In a malarial country but a small percentage of the mosquitoes which bite people are infected with malarial parasites in just the right stage for transmission. It is for the above reasons that quarantine, disinfection, abolition of drinking cups and other health department methods which are but 50 per cent perfect accomplish such good results.

The above statements do not mean that a poor health department is as effective as a good one or that any man should take a chance on breaking a health law. It does mean that he can take an occasional chance and escape the consequences. It does not follow that because you get good results from poor work you should not try to get better results from better work.

Destroying Mold Germs.—*H. M. T. asks the best method of destroying mold germs in a pantry and also suggests that care be taken in wiping the tops of milk bottles before opening.*

REPLY.—One of the best ways of preventing the growth of molds in a pantry is to have an abundance of sunlight. Frequently this is not possible, and I judge that it is not in this instance. Another thing to have is cleanliness and dryness.

All decaying and soggy wood should be removed. Everything should be made very clean. No water should be allowed on the floor or walls. No water, milk, or other liquid should be exposed in the pantry. The dripping from the ice box must not be allowed to accumulate in the pantry. Unslaked lime in pans will help to dry the air. If you can get the air dry enough, mold will not trouble you. The pantry should be aired frequently. Dry days should be chosen for this.

Disinfection is best done with formalin. Half a pint will answer for an ordinary sized pantry. Sprinkle the walls and floors with water. Soak up the formalin on a sheet, and throw the sheet over a line in the pantry. Shut the door. Using that quantity, it will not be necessary to strip the doors or windows. Leave the doors and windows closed for eight hours. Then throw everything open and air well.

Your point about washing the milk bottle, including its cover, before opening, is well taken. Milk bottles get pretty badly soiled oftentimes before the milk comes to be used, even when they start out in good shape. If the bottle is carelessly opened dirt will get into the milk.

How to Fight Epidemic.—*X. writes: "Desplaines, Illinois, has a population of more than 2,000. There are at present thirteen cases of scarlet*

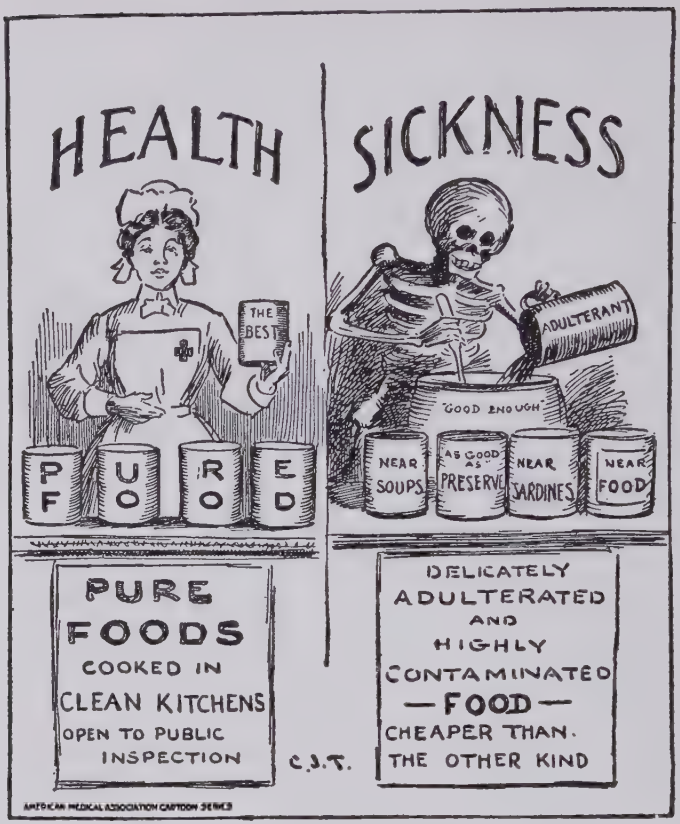


Fig. 98.—At Which Shop Shall We Buy?

fever in six different families. Would this justify the closing of the schools?"

Reply.—No. The proper plan of controlling an epidemic of scarlet fever is to put on a school nurse and reopen the schools. The students should be passed upon each morning by the teacher, who sends the suspects, including those who have been absent from school two days or over, to a holding room. There they are seen by the nurse, who sends them back to the schoolroom or into quarantine or to the family physician, according to the circumstances.

A school nursing service for such a town suffering from an epidemic should not cost more than $150 a month, which is far cheaper than closed schools. In addition it is much the better way to end the contagion.

The controlled contact of this method is much better than the uncontrolled contact of playgrounds and streets.

Danger from Rooms Where Consumptives Have Lived.—*I. M. F. writes: "Will you kindly tell me what precaution one should take in moving into an apartment where a tubercular child has formerly resided. Is there any danger?"*

Reply.—There is always danger in moving into an apartment that has been recently vacated by a person with tuberculosis. If the house is well

lighted and aired and is in a good clean condition, with dry walls, the danger is not great. If it does not come up to these requirements it should be avoided. The health department disinfects after tuberculosis. You should not move into a tubercle infected house until such disinfecting has been done. This disinfection should be followed by a thorough cleaning and airing. Certain cities, for instance, Asheville, N. C., require that a room that has been occupied by a case of tuberculosis should be disinfected when the case moves, and that a notice should be fastened on the wall, showing the date of such disinfection. Certainly people who contemplate moving should have some way of knowing whether the room to be occupied is safe or not.

FIG. 99.—FLY-SPECK GREATLY MAGNIFIED, SHOWING DANGEROUS GERMS.

Contagious Diseases.—*A. B. C. writes: "Why are children with whooping cough allowed to enter moving picture shows and other public places? Why isn't some method used to notify the public that children have this dreaded sickness or disease?"*

REPLY.—It is against the law and also against public policy to allow children in the actively contagious stages of whooping cough to go to moving picture shows. The suggestion has been made that children in the later stages of whooping cough should be tagged and allowed to go about doing necessary things. That, however, does not include attending shows.

School and Contagious Diseases.—*L. K. writes: "1. What diseases, contagious or otherwise, bar a child from attendance at school? 2. For what length of time, in each case, should the child be kept away from other children? 3. Should the child upon reëntering school present a written permission from the doctor, stating that it is safe for the child to come in contact with other children?"*

REPLY.—1. Smallpox, diphtheria, scarlet fever, measles, whooping cough, German measles, infantile paralysis, itch, impetigo, cerebrospinal meningitis, venereal disease, open tuberculosis, lice.

2. Varies with each disease.

3. Any child who has suffered from any form of contagion should present himself to the teacher in charge of the room, who refers the question of whether it is safe to allow the child to come back to the school physician. He passes on the evidence. A certificate from the attending physician is advisable, but not necessary.

Rule of Quarantine.—*Working Woman writes: "Is it customary, necessary, or required by the board of health for a working woman or man to stay at home if a young child in the same flat has measles?"*

REPLY.—No. Workers are required to room elsewhere during the continuance of quarantine. If the case is in a place where the patient can

be kept entirely away from the members of the household, rooming away is not required.

Danger of Contagion.—*W. F. E. writes: "1. Kindly advise me what the danger of contagion is in regard to scarlet fever, diphtheria, and similar diseases? 2. Is there danger of contagion by taking money from an infected person, or touching anything which that person has handled? 3. How long would the germs live, or rather how long after being exposed to the disease in that manner can one assume that the danger is past? 4. Is there any danger of contagion from contact with clothes of party from the sick house, and is the danger considerable? 5. Is a person naturally cautious about such things apt to worry unnecessarily? 6. If a family has been immune from contagious diseases to date, may it be assumed that the immunity will to a reasonable degree continue, especially when there are young children in the house?"*

Reply.—1. If ten susceptible young children are exposed in a schoolroom to scarlet fever or diphtheria, five will get it. If ten susceptible young children are exposed in a schoolroom to measles or smallpox, nine will get it. Contagiousness is greater in some diseases than others.

2. The danger from passing money or touching objects that they have touched is very slight except in smallpox.

3. Say two to three weeks.

4. Some—slight.

5. Some men worry too much, some are too indifferent—answer depends on the man.

6. Vigilance is the price of safety.

FUMIGATION

In response to inquiries several methods of fumigation appear in this book. In addition, in places the advice not to fumigate is given, while in other places fumigation is approved of, at times by direct statement, at other times by implication. In order to avoid confusion a summary of views is here presented.

Fumigation as a means of destroying bacteria is losing ground. There are certain communities where it is still employed quite generally. There are many people who believe in it. There are others who are willing to take all other precautions and to fumigate besides. Under these circumstances it is wise to give methods of fumigating.

The opinion is very general that formaldehyd is the method to be employed when the purpose is to destroy bacteria. Therefore that is the only method given. Formalin is a trade name for formaldehyd.

In using formaldehyd it is agreed that the gas is ineffective unless moisture is present. Therefore the instruction to sprinkle freely before using the gas and to have the air as moist as possible is given in all the methods. The old directions were to leave the gas-filled room unopened for eight hours. The tendency is to lessen this time requirement, sometimes to as low as four hours.

Three principal methods of generating the gas are employed: the permanganate of potash method, the formalin candle method, and the sheet

method. Of these the permanganate of potash is the best. It has the disadvantage of requiring some skill in the user. It at least appears more formidable. The sheet and the candle methods are simpler and they are nearly as effective as the other.

It will be noticed that the instructions as to the amount of gas to be used vary. Where all cracks are stuffed one pound to each 1,000 cubic feet of air is enough. But stripping paper costs some money and applying and removing it takes time. Stripping is far and away the largest element of cost. Some of the instructions specify that more than one pound per 1,000 cubic feet of gas be used and that the stripping of small cracks be not done. The extra formalin will cost much less than the cost of stripping and the money thus saved can be spent for nurses and inspectors.

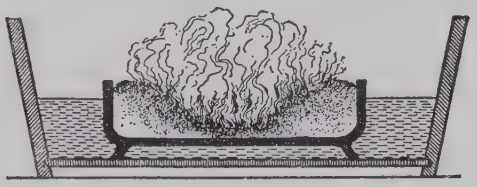


FIG. 100.—THE POT METHOD OF BURNING SULPHUR.

When it is a matter of killing insects formalin is ineffective. For that purpose the usual recommendation is that sulphur fumes be used. Sulphur fumes differ from formaldehyd fumes in that sprinkling must not be done with the former.

The dry gas is a better insect poison. In the presence of moisture the gas is converted from sulphurous to sulphuric acid, whereupon it destroys fabrics and greatly injures structures.

In the use of sulphur fumes we have the choice between using less gas in rooms, the cracks of which have been stripped, or more gas where there has been no stripping.

Hydrocyanic acid gas is very much more efficient than sulphur, but it is poisonous and can only be used by those who have had experience. To the experienced it is safe, simple and efficient.

WHEN TO FUMIGATE

It has been several years since Chapin of Providence began agitating against fumigation. The Health Department of Providence was courageous enough to stop fumigating, except after tuberculosis, about six years ago. *Hill of London, Ontario, in his valuable booklet, "The New Public Health," comes out strongly for the theory that ordinary contagion cannot be spread by the air; that if the secretions of persons sick with diphtheria and other forms of contagion are made sterile, the disease will not spread; that contagion is not due to filth; is not bred in filth; is not stimulated by filth, and that fighting contagion by fighting filth is wasting ammunition.*

In the Liverpool hospitals scarlet fever, diphtheria, and other forms of contagion have been treated for years in the general wards in beds side by side with pneumonia and rheumatism. The patients do not get cross infections, because the nurses are supremely careful in keeping their hands clean.

DISINFECTION

For all infectious diseases disinfection should be done. It is important, however, to disinfect the right thing and in the right way. Nature has provided us with the best of disinfectants. When we fail to do our duty nature will supply the deficiency if given half a chance.

Koch said: "Mere drying will destroy the germ of cholera." It will destroy other germs as well. *Sunlight and air, including the drying that so frequently results from sunlight and air, are the common agencies by which nature disinfects.*

In typhoid fever and cholera the germs are carried in the excretions. In these diseases nothing is to be gained by efforts to disinfect the air or anything else except these excretions or things touched by these excretions.

To disinfect the excretions chlorinated lime, bleaching powder or carbolic acid solution will work. The solution must be strong enough and the contact must be long enough to accomplish the result. If carbolic acid is used the solution must be at least 5 per cent strength. That means 5 per cent after the solution is mixed with excretion. It is well enough to make the solution overstrong and let it go at that. The mixture of excretion and disinfectant must stand for half an hour.

In consumption, pneumonia, and diphtheria the disease is spread by the mouth secretions, including the sputum. To sterilize these secretions heat should be used. It is feasible to burn most of the cloths, handkerchiefs, and napkins that have been used. If it is best to save some handkerchief or other cloth it can be disinfected by boiling.

If the sputum in cups is treated with a small quantity of concentrated lye and then heated in a moist chamber to the boiling temperature, it will be sterilized and can be emptied in the toilet.

While the case of infectious disease is active double effort should be made to keep things clean. The air must be kept clean. The windows must be kept partly open all the time and at intervals the room must be aired. The blinds must be up to let in some sunlight.

No disinfectant can disinfect a room wherein there is a patient. A saucer of disinfectant here and a pan there do no good. After the illness has ended and the patient has been moved the room should be scoured with soap and water, the woolen stuff aired and sunned, and the washable stuff boiled. If you feel you must fumigate use formalin.

Prior to 1912 the New York City Health Department fumigated with formalin after contagious diseases according to the prevailing customs. In 1912 they discontinued formalin disinfection after diphtheria but took the bedding used by the sick person to a central plant where it was disinfected by steam.

In 1913 the practice of disinfecting bedding with steam after diphtheria, scarlet fever, measles, meningitis, and infantile paralysis was discontinued.

In 1915 they discontinued the formalin disinfection after contagion. They now stand where Providence has stood for years, except that they do fumigate after tuberculosis only in rare cases.

The position taken by Providence, New York City and some other up-to-

date cities is that sunlight and air are effective disinfectants. Contagion is seldom spread by the air. Therefore, formalin disinfection of the air is not needed. Formalin gas is not an efficient disinfecting agent for bacteria located on surfaces and in fabrics—therefore, formalin is inefficient. Being unnecessary and inefficient it should not be used. In lieu thereof, sunlight and air supplemented by soap and water are recommended. Supplementing but not replacing soap and water, disinfectants in solution can be used to wipe off floors and similar surfaces. The best of these is the group of creosote preparations. Of these none is better or cheaper than the compound solution of cresol.

In London, nine-tenths of the contagion is cared for in the contagion hospitals, where there are 10,000 beds. Scarcely any attention is paid to measles. The reason is that measles is only contagious during the first few days. By the time the case is seen, a diagnosis made, the case reported, and the department inspector gets around, the case is no longer contagious. The authorities do not fumigate after measles.

The position taken by the New York Health Department is that *"disinfection of most effective sort is performed by air and sunlight,"* and that, in view of the tendency of contagion germs to die quickly when dried, formalin disinfection is seldom required.

How to Fumigate.—*J. H. S. writes: "Will you give a simple recipe for fumigating? Would it not be well to fumigate any filthy house recently vacated before reoccupying it?"*

Reply.—To fumigate, buy one pint of formalin for each 800 cubic feet of air space. Close the large openings, such as doors, windows, ventilators, fireplaces. Sprinkle the floor, walls, and all furniture and bedding with an excess of water. Make things pretty sloppy. Open all closet doors. String clotheslines across the room. Wring sheets in hot water. Put the formalin on the sheets, one pint for each 800 feet of air space. Leave the room unopened for eight hours, then throw open the windows and air the house for several hours. Scrub and clean exceptionally well.

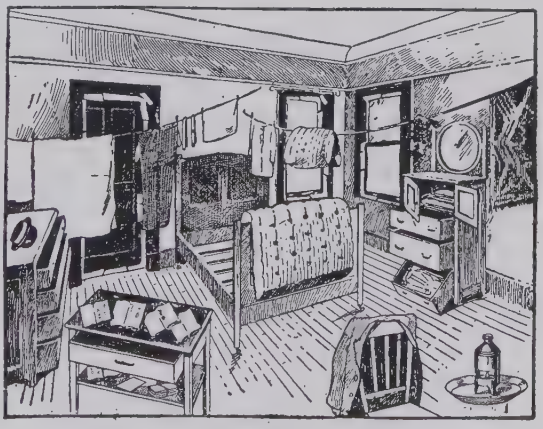


Fig. 101.—Room Prepared for Fumigation. (Johnson and Johnson.)

This airing, scrubbing, and cleaning is the most important part of the process, which, taken together, is called fumigating. If the windows, door cracks, and keyholes are stripped you can use less formalin—say one pint to 1,000 feet of air space. The permanganate method is better, but it is more complicated and less safe.

This fumigation does not kill insects or bugs. A little formalin or other antiseptic poured around does no good.

Fumigating filthy houses where there has been no contagion is excellent, provided we remember that the airing, sunning, scrubbing, and cleaning constitute the more important part of the process.

The Grip and Fumigation.—*Mrs. M. I. F. writes: "Enough cannot be said, it seems to me, about isolating cases of grip and effective fumigation following recovery. Would it not be possible for you to give an exact formula for the use of formaldehyd and permanganate of potassium, so that your readers might feel safe in using it? As it is, few people, save the medical profession and nurses, undertake complete fumigation."*

Reply.—Influenza (or grip) is undoubtedly contagious, particularly at certain seasons of the year. The wide spread of the disease, however,

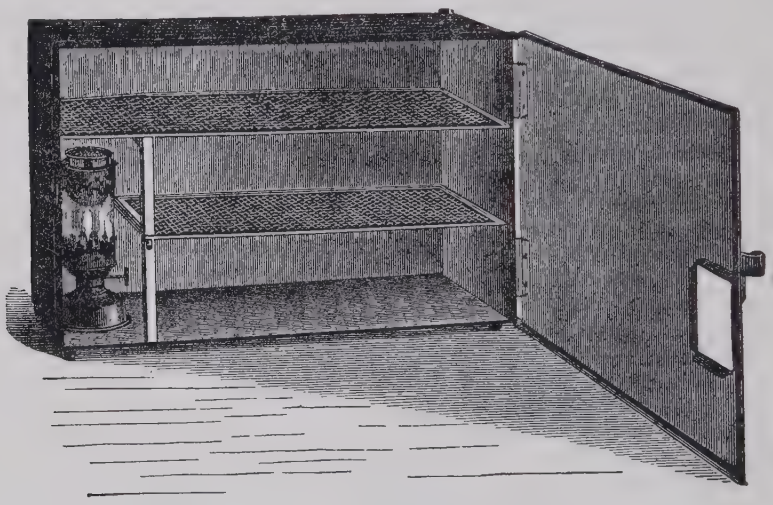


Fig. 102.—Formaldehyd Sterilizer.

would make it impracticable to isolate those who are suffering from it and thus infect the houses. The contagion is transmitted by the air and by personal contact. It is doubtful whether houses and clothing carry it.

Disinfection of houses with permanganate of potash and formaldehyd is done as follows:

[a] Seal tightly doors, windows, fireplaces, and other openings.

[b] Freely expose all articles on the premises.

[c] For every thousand feet of air space use seven ounces of potash permanganate and sixteen ounces of formaldehyd.

[d] Place a large vessel, one holding about eight gallons, in the center of the room; deposit the crystals of the potash permanganate in the vessel and pour the formaldehyd over it. One such outfit should be employed for every thousand cubic feet of air space in the house.

How to Fumigate Room.—*H. E. B. writes: "Please tell me how to fumigate a room used by a person with an infectious disease so the pillows, mattress, and clothing will be perfectly safe."*

Reply.—Close all doors, windows, fireplaces, and other openings. Strip all cracks with paper. Strip paper in rolls, for the purpose, is on the market.

Ordinary newspaper and ordinary paste will answer. Sprinkle everything in the room; saturate the air with moisture as thoroughly as possible. String a clothesline across the room; dip several sheets in formalin (use one pint for each 1,000 cubic feet of air), and hang on the line. Leave the room sealed tightly for eight hours. Open the windows and doors wide. Air the room thoroughly for from four to eight hours. Scour all the woodwork with soap and water. Sun the mattress, bedding, rugs, and other fabrics. Boil all towels and other washable fabrics.

Fumigate the Book.—*E. A. H. writes: "Do you think it advisable to take back a medical book that a family borrowed before being taken sick with scarlet fever? One of the children died. I have two small children myself."*

Reply.—You may take the book back with safety if you will leave it opened out in the sun for two days and have it aired well for another day. To feel entirely safe, fumigate it in addition to the sunning and airing. To fumigate: place the book in a tight box, a cubic foot or less in size; sprinkle the book and the inside of the box well; sprinkle two ounces of formalin in the box; close tight; leave for eight hours; air well.

Fumigation by Gas.—*Constant Reader writes: "Is fumigation of house or room with hydrocyanic gas the best method of exterminating all insect life therein? If so, what in brief is the process?"*

Reply.—Do not use hydrocyanic gas for fumigation. It is much too poisonous. Sulphur fumes will kill everything except bedbugs, and it has the advantage of being safe. If the cracks are sealed, to burn two pounds for each 1,000 cubic feet is enough. If the cracks are not tight make it three.

Fumigation Method.—*Mrs. J. S. W. writes: "1. We intend to move into another house, and as a precautionary measure, mother is desirous of disinfecting it. 2. Will cloths saturated with formaldehyd and same evaporated by placing over a gas heater be an effective method to accomplish this? 3. Or would better results be obtained by placing the formaldehyd in a dish on the heater and vaporizing it in that manner? 4. Is it desirable to use any other chemical with it? 5. How much formaldehyd should be used for an average size room?"*

Reply.—1. If there has been no contagion in the house recently you will gain nothing by fumigating. If there has been contagion recently, and there is any danger, the health department will fumigate for you. A good cleaning, airing, and sunning is better for an ordinary household condition than fumigation without these.

2. Yes.

3. The sheet method, as suggested in question 2, is the better.

4. No.

5. One pint at least for each 100 square feet of floor space. Moisten the floor, walls, and furnishings prior to using formalin. Strip the windows and doors. Leave the room undisturbed for eight hours after fumigating.

Fumigation of Cars.—*J. B. W. writes: "I am a resident of Chicago, passing the winter months in the South. It is almost a daily occurrence to see patients in various stages of tuberculosis arrive and depart, usually in the drawing-room of the Pullman. Have known of persons desperately*

ill, in a vain attempt to reach home in the North, dying en route. Will you kindly inform me, as well as others keenly interested, if there is any law concerning the fumigation of the Pullman coaches, and if so how often is the fumigating done? In other words, what protection has the traveling public against infection from the germs of tuberculosis, typhoid, diphtheria, etc.?"

REPLY.—There is no law, nor is there any regulation of the Interstate Commerce Commission. I think this is a matter on which they could legislate through regulations having the same force as laws. The Pullman company disinfects its cars at frequent intervals, at least it does those which run into central points. What it does with cars making somewhat isolated runs I do not know.

Fumigation after Consumption.—*S. M. J. writes: "Please advise me about moving into a house that has been occupied by consumptives, one dying there."*

REPLY.—If the authorities will fumigate, have them do so. If not, do the fumigating yourself. Proceed as follows:

1. Close all large openings.
2. Strip the windows, doors, keyholes, and all other minor openings.
3. Open all drawers, disarrange all bed covers.
4. Sprinkle everything thoroughly.
5. Soak sheets in formalin and hang them on ropes.
6. Use one pint of formalin for every ten feet square of floor space.
7. Leave the rooms closed for eight hours.
8. Open the windows and air thoroughly for a day.
9. Scour all woodwork with soap and water. Boil all washable goods.
10. Sun everything for a day or more.

CHAPTER XIX

Contagious Diseases

SMALLPOX

For smallpox as a community disease there are two methods of treatment: vaccination and hospitalization.

For fires as a community ailment there are two methods of treatment: fireproof construction and fire engines.

To prevent smallpox, most states use both methods. Minnesota and a few neighboring states say, if everybody is vaccinated, there will be no smallpox. It is unjust to make the vaccinated pay for expensive smallpox hospitals. The quickest way to get everybody vaccinated is to make it impossible for the unvaccinated to impose on the vaccinated.

"We will not support smallpox hospitals." A thoroughly logical position—one that will be tenable when knowledge is better diffused and human judgment is better. But as yet we have not reached the stage where all men are judicious enough to make it fit. The peculiarly minded minority so tyrannize the majority that few health officers deem the Minnesota policy best.

No one has yet proposed to do away with fire engines and thus force everybody to fireproof construction.

Compulsory vaccination laws have been enforced in every European country for about a quarter of a century. With them this question has not been open for debate, except in England, for about a generation. In Cuba, Porto Rico, Panama, and the Philippines it is also demonstrated, proved, accepted, and no longer discussed. When, however, it is proposed to do as much for the children of Louisville as we have done for the Filipino, there rises up a small but noisy group, shrewd enough to cry out in the name of liberty. License would be a better term, but it is not catchy, and Bellamy has termed this a phrase-catching age.

In this group there are no men who have had any practical experience in controlling smallpox. That all of those, whether engineers, nurses, or doctors of the different schools who have been charged with the responsibility of handling smallpox are firm believers in the efficacy of vaccination is a source of great concern to the anti-vaccinationists, and, in consequence, they seek to borrow some names to conjure with. Their prize package is Sir Alfred Wallace.

Now, what are the facts about Sir Alfred that would lead anyone to think that his judgment on this point can be safely followed? He was born in 1823. In 1858 he dreamed out the theory of natural selection almost simultaneously with Darwin. As soon as he got over the chills he went to

England, got into close touch with Darwin and for fifteen years fought the battle of Darwinism.

In the middle seventies he renounced religion and in 1881 became a spiritualist and aligned himself against the material and in favor of spirit direction soon thereafter.

In 1885 he wrote "Forty-five Years of Registration Statistics," in which he sought to prove that the statistics showed that smallpox was not on the decrease from 1840 to 1885.

He never had any experience with smallpox or vaccination, disease prevention, hygiene, or sanitation, and therefore the conclusions of this old man, honored though he justly was, represent nothing except the conclusions of an anti-materialist drawn from the somewhat imperfect statistics of a period when vaccination was quite imperfect. It would take more than Wallace to convince the man of the street that there is as much harm from smallpox as there used to be.

HOW TO CONTROL SMALLPOX

Controlling smallpox is easy. There is no other disease whose control is so easy. Health officials know exactly what to do. The epidemiology of the disease is so well worked out that any health officer who knows his business can guarantee results. There are a thousand men in the United States who would be willing to enter into a contract with any community to guarantee permanent freedom from smallpox and make the bond forfeitable on failure to make good.

It has not been long since many people believed disease could be blown long distances. Now we know that disease stays put. Whenever it travels it must have a person, or animal, or insect to carry it. Persons are much the most important of these three carriers or distributors.

Smallpox was the disease wherein the proof that air could carry disease seemed most convincing. Chapin's book, published in 1910, gives ten pages to a discussion of whether smallpox can be air borne or not. The proof that it is is largely based on observations made in 1881. Opinions based on work done thirty years ago are not of much value. Chapin sums up as follows:

"The evidence in favor of the aerial transmission of smallpox from hospitals is so slight that it should never influence a municipality in its selection of a hospital site. The success of Edinburgh, New York, many German cities, and the Pasteur hospital in Paris in caring for smallpox in connection with other diseases and even in the same building with other patients indicates that the theory of aerial infection has little basis in fact."

Smallpox is spread by close contact with a person who has the disease. Contact such as that common on street cars and railroad trains is sufficiently close for some people, but not for all. An unvaccinated milkman delivering milk at the kitchen of the smallpox hospital in Chicago contracted smallpox once upon a time. It was never proved that he went into the hospital.

What secretion spreads the disease we do not know. We have no in-

formation proving it to be scabs or scales on the one hand or nose or mouth secretions on the other.

The difficulty in controlling smallpox since 1898 has been the mild cases. When a man has smallpox he has some sort of a sore somewhere on the

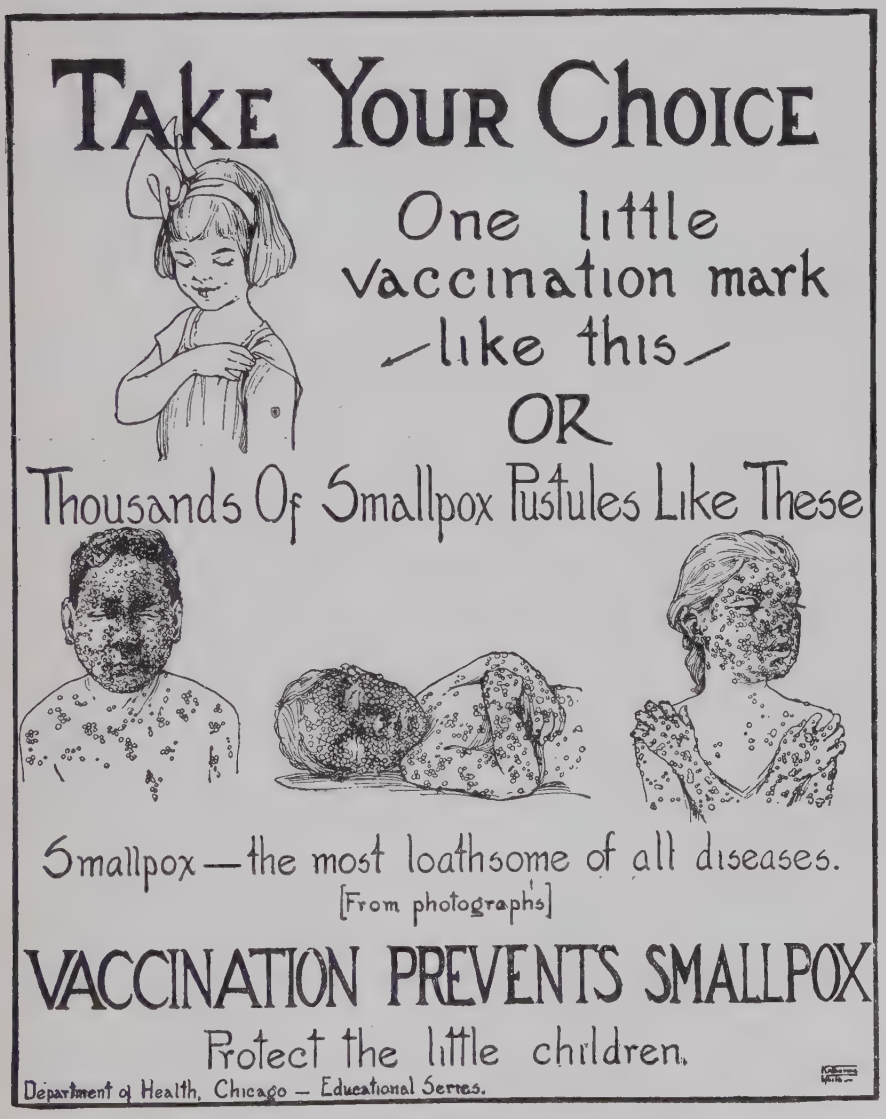


FIG. 103.

body. Even the mildest cases have that. None of the cases end in "colds" or other mild, deceiving forms of sickness. However, the smallpox sores may be so few and the fever and aches which precede or follow them so mild that the man thinks his "blood out of order." It does not occur to him that so mild a disease could possibly be smallpox. He may have

four days of fever and aches and then break out here and there. He feels much better than when he had fever, but his sores are a little too sore for him to go to work, so he visits around for the rest of the week.

These mild cases are just as contagious as the more violent ones. In fact in the Middle West 90 per cent. of the smallpox is spread by these walkers.

The incubation period of smallpox is twelve days. That means that the virus which has got into the susceptible man's body rests there for twelve days. What happens during that time nobody knows.

On the twelfth day the disease starts with a severe chill, high fever, headache, and a bad backache. If it is a malarial country the chances are that the diagnosis will be chills and fever and the treatment will be quinin.

At the end of the third day or on the fourth day the fever goes down, the headache and backache stop, and the sick man thinks the quinin has broken his chills.

He may get up and go down to the drug store for a soda or go out and call on his friends. Some friends will call his attention to a little breaking out probably on his forehead; or maybe there is some itching and he notices the eruption when he scratches.

The eruption feels like a shot under the skin. By the end of the third day the small, red, bullet-like mass is capped by a little water blister. The blister part gets larger each day.

The blister seems tied down in the middle. By the sixth day of the eruption the blister is full of matter instead of water as at first.

In the old-style smallpox the eruption usually appears first on the forehead but in this mild disease that came to us from Mexico sixteen years ago the eruption is exceedingly light and may appear first anywhere on the body. Bumps appearing on the scalp, on the soles of the feet, or in the palms of the hands after several days of fever and backache always suggest smallpox even though but one or two shotlike spots are present.

There is not much treatment for smallpox. Good care in a good, airy hospital is the only treatment required. The nurses will see to it that the blisters are not broken and that scratching does not cause secondary infection.

Smallpox is of all diseases the most contagious for unvaccinated people. The vaccinated come and go in a smallpox hospital without thought of contracting the disease. The only persons who contracted smallpox in the Chicago smallpox hospital in twenty years were three unvaccinated boys who got in "unbeknownst."

One hundred years ago there were people who thought that if a person would keep clean he would not contract smallpox. Nobody who has experience with smallpox has believed this doctrine during the last fifty years.

LESSON OF AN EPIDEMIC

The city health authorities advise us from time to time. The organized opposition from time to time advises us to disregard the health department. The man of the street would like to know whose advice to take.

On November 13, 1913, I read that twenty years ago, on November 13,

1893, Health Commissioner Reynolds of Chicago prophesied: "We shall no doubt have a great deal of smallpox this winter."

I thought my readers would like to know whether Dr. Reynolds knew what he was talking about. It might help them to decide whether to accept or reject present day advice.

Turning to the records I found that a case of smallpox came to Chicago on June 12, 1893. There was one death in June, one in August, one in September, four in October, and two in November.

On November 14 Dr. Reynolds wrote to Albert Lane, superintendent of Chicago schools, of the impending storm. On November 17 Archbishop Feehan sent out a circular letter advising vaccination. 1893 closed with a record of 140 cases and 23 deaths.

In December, 1893, the mayor and health commissioner began communicating with the council about the condition. The council did not act until April, 1894.

The record for 1894 is awful. The department treated 2,332 cases of smallpox in the hospital that year. There were 1,033 deaths from the disease. During the year forty people dead from smallpox were found in abandoned houses. Whether the unfortunates were deserted while still alive there was no way of knowing.

The official report says that for a while in May the cases came so fast that the clerks could not keep the record straight. The record for the first portion of the year was:

January—176 cases, 29 deaths.
February—219 cases, 55 deaths.
March—276 cases, 100 deaths.
April—321 cases, 157 deaths.
May—518 cases, 253 deaths.

By May the town was in a wild alarm. The health department was given a free hand. The council voted it 500 vaccinators. Additional hospital facilities were secured. Provision for the present smallpox hospital was under way. In May alone 586,500 free vaccinations were done. In all, 1,200,000 free vaccinations were done on Chicago's 1,500,000 people. Seventy thousand free vaccinations were done on the 185,358 children of the public schools.

By June the wave had reached its crest. The record of its gradual subsidence is as follows:

June—Cases 191, deaths 171.
July—Cases 82, deaths 57.
August—Cases 112, deaths 53.
September—Cases 82, deaths 31.
October—Cases 105, deaths 40.
November—Cases 120, deaths 51.
December—Cases 130, deaths 42.

The 1895 report shows that the disease was still exacting toll in that year. In January, February, and March there were 112 deaths; in April, May, and June, 31; in July, August, and September, 12.

The epidemic ended twenty-seven months after the first case occurred, twenty-two months after Dr. Reynolds issued his warning, seventeen months

after the city council had heeded the warning. One thousand two hundred and eleven lives had been lost.

Going back to the reports issued in the beginning we find that the commissioner was horrified when he discovered so large a proportion of the people unvaccinated. He said that the proportion of unvaccinated was greater than at the beginning of the great epidemic in 1883. That epidemic began in April, 1880, ended in June, 1883, and cost 2,561 lives.

The only hope of shortening that record and lessening the rate was to excite public interest. This Dr. Reynolds went at in earnest. In spite of the help given him by the pulpit and press interest commensurate with the need was not excited until April. By summer the backbone of the epidemic was broken but, snakelike, the tail lived on for more than a year.

Lord God of Hosts, be with us yet,
Lest we forget! Lest we forget!

HOW PUNISH THE WEAK SISTER?

In April, 1912, smallpox appeared at Niagara Falls, New York. A study of the reports of the Public Health Service and of reports of the State Board of Health shows that the disease has been continuously present there since. The report of the Public Health Service shows that for the week ended May 31, 1913, five cases were reported.

When a town or city with an organized government continues to have smallpox developing during the hot weather it is a sure sign that the government is failing to make use of some of the measures for control that succeed elsewhere.

The same government reports showed that smallpox was present in Evansville, Indiana, early in the summer of 1912. During the summer and fall new cases were appearing from time to time. The public health report dated June 20, 1913, says that "during the week ended June 14, 1913, nine cases of smallpox had been notified in Evansville, Ind., making a total of 818 cases reported since October 1, 1912."

In January, 1911, I was traveling in southern Illinois on an Illinois Central train running to Evansville. I overheard the brakeman telling of a case of smallpox which had been in his next door neighbor's home for ten days or two weeks. They had taken the case out the day before. He did not think much of the brand of protection used in Evansville.

At the present day the control of smallpox is so satisfactory that when a community continues to develop cases, particularly when a hot season passes without letup in the cases, it is certain that something is wrong.

I am informed that the anti-vaccinationists are the public enemies who are giving Evansville a bad reputation and endangering communities within railroad reach of Evansville. I am informed by the secretary of the State Board of Health that the opposition has made use of injunctions and other obstructive legal machinery.

I have before me clippings from the Evansville papers that show where the reason for Evansville's disgrace lies.

A Dr. Kunath writes about "this smallpox 'scare' sent out by the

Board of Health, their false representations and threatening dictations." Another is headed: "Protest at Board Order—Delegation of Anti-vaccinationists at Mayor's Office; Members of the Physio-mental and Anti-vaccination Society Called on Mayor Heilman, Demanding the Resignation of the Board of Health."

It is plain that these communities are not suppressing smallpox, because they are not making use of all the necessary measures. They are not doing so because of the obstructive tactics of well meaning but misguided people. They are to be pitied. Perhaps to pity them is punishment enough.

THE TWO NIAGARAS

Smallpox was imported into Niagara Falls, New York, on April 5, 1912. There is no compulsory vaccination ordinance in that town. There is a good deal of anti-vaccination sentiment extant. The percentage of unvaccinated people among their population is above the average.

There are two methods of controlling smallpox—isolation and vaccination. Niagara Falls officially depends on isolation alone. The vaccination done is on individual initiative.

Let us see if Niagara Falls, New York, has shown efficiency in handling smallpox. The records of the New York State Health Department show that cases of smallpox have been reported from Niagara Falls each month since April, 1912.

The highest number of cases was 18 in February, 1913, the lowest 1 in October, 1912. The total number of cases up to November 8 was 143. The state record shows 132 cases up to October 1 and the government record for three weeks in October and one in November shows 11 additional cases.

It will be noticed that the epidemic kept up straight through two hot seasons. Smallpox disappears in hot weather under any effort at suppression worth while.

As Niagara Falls, New York, has only 30,000 inhabitants, we get a better idea by saying that had Chicago had the same rate it would have meant 14,000 cases but in order to form an intelligent judgment it is advisable to have a city for comparison.

Immediately across the river from Niagara Falls, New York, is that other summer resort, Niagara Falls, Ontario. Smallpox was imported into this city in February, 1913. It developed in the Tremble House near the Michigan Central depot. At first the health authorities tried isolation and vaccination by moral suasion. The city council voted down a compulsory vaccination ordinance.

The provincial board of health made its arrangements to quarantine all Canada against Niagara Falls, Ontario, whereupon the city general council voted the proclamation for vaccination. Seventy-five per cent. of the population obeyed the proclamation. The school children were vaccinated. The epidemic was speedily stopped. By May Niagara Falls, Ontario, was free from the disease. In all they had had 45 cases.

In one town the epidemic lasted three months in all. About one month after vaccination got under way in earnest the epidemic was broken. In the other town the epidemic is at the present writing in its twentieth month

and still hangs on. They will either change their method or the disease will hang on indefinitely.

Twenty years ago smallpox epidemics in cities of 500,000 inhabitants kept up for several years. In the last ten years no large city has had an epidemic keep up through the hot weather. Towns of 30,000 find it easy to end a smallpox epidemic in two or three months. And yet here in this twentieth century, in the Empire State, is a community which has had this millstone around its neck for some time including two hot seasons and which seems helpless.

The disease is very mild. It is costing no lives but it must be costing business something. Such a record of inefficiency among thinking people is a reflection on the business acumen of the business people. What's the use of building spotless show factories in such a place?

The figures cited above were obtained from the United States Public Health Service, the New York State Department of Health, and the Ontario Provincial Board of Health.

COST OF PROTECTION

An expert in the handling of smallpox would willingly enter into a contract with any community to protect it against smallpox.

The terms of a contract for a city of 100,000 inhabitants would be about as follows: The community would require that every child be vaccinated before reaching two years of age and should be revaccinated once every ten years. In case a person with smallpox enters the town every person brought in contact with the case would be required to be revaccinated. The community would pass the laws and compel their observance. The expert would do the vaccinating, diagnose, treat and care for the cases. He would figure the cost of the vaccine at $500 a year. Properly organized the service could be rendered for $2500 a year. A city thus protected would require no hospital. If we figure $2000 as the hazard in view of his guarantee we would say that the cost of guaranteed protection against smallpox would be $5000 a year or 5 cents an inhabitant.

VARIOLOID

In earlier years the term "varioloid" was used to denote an attack of smallpox that had been modified and rendered mild by a vaccination that did not fully protect. The term is one that works mischief because it leads to the belief in the uninformed that the disease is something different from smallpox and not contagious.

Varioloid is nothing more or less than smallpox. It is now known that neither smallpox nor so-called varioloid occurs in the vaccinated; and the scar noticed in the old days in varioloid cases was not from vaccination but from infection of the site of vaccination.

Finsen Method Has Failed.—*W. G. K. writes: "I remember reading some years ago that the late Dr. Finsen claimed to have discovered that if a smallpox patient was kept in a room lighted by a nonactinic*

light he would not be sick much, would recover quickly, and not be pock-marked. In other words, he claimed that it was the actinic qualities of white light (that acts on the salts of silver) that make practically all the trouble to the person sick with the disease. I have asked several physicians at different times, but they have seemed to know nothing about it. The fact that a person's face, which is not protected from the light, is worse marked than other parts of the body, would incline a person to think there is something to it. If the theory has been proved correct, it should be given wide publicity."

REPLY.—The method was tried extensively in Chicago. It has failed. Smallpox is now so mild that there is not much need of improving the methods of treatment. In December, 1912, 769 cases with twenty-one deaths were reported. Twenty of the deaths were in Texas; Hunt County, Texas, had sixty cases and eighteen deaths. Until the Texas type gets up this way no treatment, except rest and care, seems to be needed.

No Smallpox Danger.—*A. H. writes: "Is it perfectly safe to harvest and distribute promiscuously for use ice from a body of water that receives the sewage from a city that has had from twelve to twenty cases of smallpox for a year past? From November to March there is no current except what runs from the sewers."*

REPLY.—Smallpox is not spread in that way. Therefore danger from smallpox would be no reason why the ice should not be used. There would be danger from typhoid unless the body of water is large. Aside from the danger, people do not enthuse over eating frozen sewage.

Mild Form of Smallpox.—*A. M. writes: "Please state if there is a rash called Cuban itch and a home remedy for it. Our doctor seems to know nothing about it and his remedies do no good. Is it contagious?"*

REPLY.—Soon after the Spanish War smallpox came in from Mexico. It was a mild form and was called Cuban itch by some people. The Cubans do not know of Cuban itch. What is sometimes called Cuban itch is smallpox.

Two Distinct Diseases.—*M. M. C. writes: "There is trouble with smallpox in my city, caused largely by the fact that doctors are first diagnosing it as chickenpox, especially cases in children. Are these two distinct diseases, or the same? Is smallpox so contagious that it can be carried in the clothes of one well person from the bedside of the patient to another person, or does it take actual contact with the patient himself to contract the disease?"*

REPLY.—1. Smallpox and chickenpox are not the same. It is a safe bet that the children referred to had smallpox.

2. Rather close contact is required. A person who had not been in contact with a case of smallpox cannot be infected by a well person who has been in such contact.

If the town will enforce universal vaccination the disease will be under control reasonably soon.

VACCINATION

In 1901 the Chicago Health Department issued the following vaccination creed:

After many years of experience with Smallpox and Vaccination, the Chicago Department of Health hereby declares:

FIRST.—That true Vaccination—repeated until it no longer "takes"—ALWAYS prevents smallpox. NOTHING ELSE DOES.

SECOND.—That true Vaccination—that is, vaccination properly done on a CLEAN arm with PURE, potent lymph and kept perfectly CLEAN and UNBROKEN until the scab falls off naturally—never did and NEVER WILL make a serious sore.

THIRD.—That such a Vaccination leaves a characteristic scar, unlike that from any other cause, which is recognizable during life and is the ONLY conclusive evidence of a Successful Vaccination.

FOURTH.—That no untoward results ever follow such Vaccination. On the other hand thousands of lives are annually sacrificed through the neglect to vaccinate—a neglect begotten of LACK OF KNOWLEDGE.

Although cases of smallpox come to Chicago frequently the disease has never made any considerable headway since the health department began actively using this creed to educate the people. In the fifteen years since this creed was promulgated no scientist has disproven any part of it. No community which has followed it has had any serious trouble with smallpox. Certain communities that have had smallpox and have tried to control their epidemics by other means have had to come to vaccination methods as embodied in this creed before they were able to control their epidemics.

Discovery of Vaccination.—Dr. Edward Jenner of Berkeley, England, had heard that dairymaids were liable to catch "a certain sore called cowpox found occasionally on the teats of dairy cows." Furthermore, he heard that a dairymaid who had had cowpox could not have smallpox. He investigated the subject. By experimenting he proved that one who had recently had cowpox could not be inoculated with smallpox.

Jenner told Hunter his opinion in 1770 and in 1798 he published it. The experience of the last 116 years has proven that Jenner was right. Everywhere in all lands where people study and know the fact is appreciated.

As a good shower of rain renders dead grass non-combustible and thus stops a prairie fire, so vaccinating the population ahead of smallpox stops the epidemic by rendering the people immune.

Jenner's discovery was made before the days of bacteriology. In recent years the bacteriologists discovered the scientific basis for vaccination against smallpox. Applying the same principles they have discovered effective methods of vaccination against other diseases—for example, typhoid fever and lockjaw in man, cholera in hogs and blackleg in cows.

Production of Smallpox Vaccine.—A sound calf proven free from all forms of disease is inoculated with cowpox vaccine. The side of the belly is cleaned, made aseptic and shaved. It is then scarified and inoculated with vaccine. The vaccinated area is kept free from dirt. When the vaccination begins to take the exuding lymph is gathered up, ground in sterile mortars and mixed with glycerin. The glycerinated lymph is generally marketed in sealed glass tubes. Before it is used it is proven free from lockjaw and ordinary pus bacteria by laboratory tests. Glycerinated vaccine,

BEFORE AND AFTER
SMALLPOX
Criminal negligence defaced this beautiful child for life.
A little scar on the arm will prevent thousands of scars on the face.
I'M SAFE !
A pock-marked face is an ineffacable badge of ignorance or neglect.
VACCINATION POSITIVELY PREVENTS SMALLPOX
Protect the Children — Protect Yourself
KATHERINE FIELD WHITE - 1914
Chicago Health Department, Educational Poster Series, No 208

FIG. 104.

properly ripened and kept in a cool, dark place, will remain potent for several months.

Properly inoculated into a person susceptible of having smallpox it will cause a vaccination sore. It will not cause tuberculosis, syphilis, lockjaw or blood poisoning. Tubercle bacilli cannot live in glycerin. Syphilis is not possible because cows do not have syphilis. If the vaccinated man develops lockjaw or blood poisoning it is because the bacteria responsible got into the vaccination wound from his clothes. If the arm becomes very much inflamed and the sore suppurates it is because of pus infection after vaccination.

The vaccination blister is typical in appearance. Suppurating wounds do not protect against smallpox. Very bad arms do not protect against smallpox.

A vaccination scar shows typical pits. These pits can be made out for years. Unless the scar shows them there is no way of knowing that the person is protected against smallpox except by trying to vaccinate him again. If he has a typical scar less than ten years old he will not have smallpox. If he has a scar without pits he cannot be certain that he is immune unless several attempted vaccinations have failed to take.

Between 1899 and 1914 the Chicago Health Department observed 2,588 cases of smallpox; 2,218 of these had never been vaccinated. Of the 370 remaining a few had typically pitted scars but the vaccinations had been done years before and there had been no revaccination. In most of the 370 the scars were atypical as well as old. None of the 156 persons who died of smallpox had ever been vaccinated.

When to Vaccinate.—Vaccination may be done at birth or any time thereafter except when suffering from an acute disease. It may be done after exposure to and infection by smallpox. One so infected will not come down with the disease before twelve or fifteen days, as vaccine works much faster than that. A vaccination soon after exposure to the disease, if well done, will take and protect the patient against the disease.

Every child should be vaccinated before it is weaned, for it is as much the duty of parents to protect their child against smallpox as it is to protect it against the evils of cold or hunger.

One vaccination will frequently protect for a lifetime, but it is found that vaccination will generally take twice in a lifetime, once in childhood and again in adult life.

As there is no way to measure immunity to smallpox except by vaccination, it is well to try a vaccination again, especially if exposed to the disease. If the vaccination will not take smallpox will not take.

Where to Vaccinate.—As most people are right-handed, vaccination is generally done on the outside of the left arm near the shoulder.

It is well to keep the arm reasonably quiet while it is sore and any limitations to the use of the arms causes less inconvenience in the left arm than in the right.

Before the days of pure vaccine and antisepsis there were many large scars on vaccinated arms due to infections that were eyesores to the ladies and consequently there sprang up a desire for vaccination on the leg. These vaccinations are objectionable because the wound cannot so easily be kept

quiet or clean, as the swish of the skirts is apt to infect it with the dirt of the streets.

How to Vaccinate.—First, clean the arm with soap and water and then sterilize with alcohol. Then scratch the outer skin with a dull needle making a place about an eighth of an inch in diameter. It is not necessary to draw blood in vaccinating. A little oozing will do no harm but bleeding may wash away the vaccine lymph.

After the scarification is done the vaccine is put on the denuded surface and allowed to dry before the arm is covered. The wound should not be handled at any time and will rarely need to be covered. Sometimes a clean, loose piece of linen or gauze may be fastened to the sleeve to act as a cushion over the wound but at no time should the arm be bandaged or have adhesive straps to hold a shield or covering over the wound. If the wound should become infected it must be treated as any other infected wound. If a shield is placed over the vaccination it should be removed within twelve hours. The only object of a shield is to save time. Glycerin dries slowly.

Smallpox, before the days of vaccination, was a very common disease. Those persons whose features were not pockmarked were the exception. No class was exempt. Queen Mary of England died of smallpox in the year 1694.

Perhaps the most striking and forceful comment ever made upon the disease and its prevention was by Lord Macaulay when discussing the death of Queen Mary in his History of England. He said:

"That disease over which science has since achieved a succession of glorious and beneficent victories was then the most terrible of all the ministers of death. The havoc of the plague had been far more rapid; but the plague had visited our shores only once or twice within living memory; and the smallpox was always present, filling the churchyards with corpses, tormenting with constant fears all whom it had not yet stricken, leaving on those whose lives it spared the hideous traces of its power, turning the babe into a changeling at which the mother shuddered, and making the eyes and cheeks of the betrothed maiden objects of horror to her lover."

Anti-vaccinationists.—In spite of the facts that are open for the perusal of all, there are still people who style themselves anti-vaccinationists, and who from time to time get into the limelight. They are always people not willing to learn the facts or not capable of understanding, and some of them may be quite normal in other respects. It is probable that there will ever be some of their kind, for there is always someone to take the opposite side of every question. The anti-vaccinationists can only flourish where there is no smallpox in a community, and, thanks to vaccination, that is most of the time. An outbreak among those who have neglected vaccination always puts the anti-vaccinationists to flight until the sad occasion is forgotten.

Vaccination is not compulsory in the United States except that it is generally required of children before admittance to the public schools and of men before admission to the army.

In times of freedom from smallpox communities neglect vaccination, there is no propaganda continually preaching it, doctors neglect to urge it and medical colleges become slack in teaching it with the result that in time there is

a large number susceptible to smallpox. Then the disease is somehow introduced. Everybody gets vaccinated and the disease is eradicated. There is rarely any serious objection to vaccination when smallpox is present. Indeed it can safely be said that vaccination is more broadly accepted than is religion, for there we have dissenters, too.

How to Vaccinate.—*Z. writes: "A friend lives in the country, where she and her children often meet neighbors, but where it is difficult to see a doctor. If fresh vaccine points were sent to her, would it be advisable for her to vaccinate her family? She is intelligent, but without special training as a nurse or in medicine. What is the process?"*

REPLY.—1. If the danger of smallpox is imminent, yes; otherwise she had better call a doctor.

2. Scrub the skin clean with soap and water and then with alcohol. Sterilize a needle in alcohol. Scratch a place one-third the size of the nail of the little finger. Scratch deep enough to cause oozing, but not bleeding. Break the ends from the vaccine tube. With the small bulb express the lymph on the oozing area. Keep the sleeve up until the lymph has dried. Wrap a clean handkerchief lightly around the arm. Keep the clothes extra clean, keep the skin extra clean for two weeks.

If the vaccination is taking, the arm will get sore five days after the scarification. Unless it does, the vaccination has done no good. Vaccinate on the arm. Use one tube for each person. The cost of vaccine to large purchasers is three to five cents a point. At retail price it should not exceed ten cents. Some people never take but once; some once every twenty years; some once every ten years. Occasionally a person is found who will take again after five years.

Experts and Theorizers.—*W. A. B. writes: "England passed a compulsory vaccination act in 1853, insuring the vaccination of 98 per cent. of all children born. Nevertheless, twenty years afterwards the country suffered the worst epidemic in its history, in which 8,000 vaccinated children under five years of age died of smallpox."*

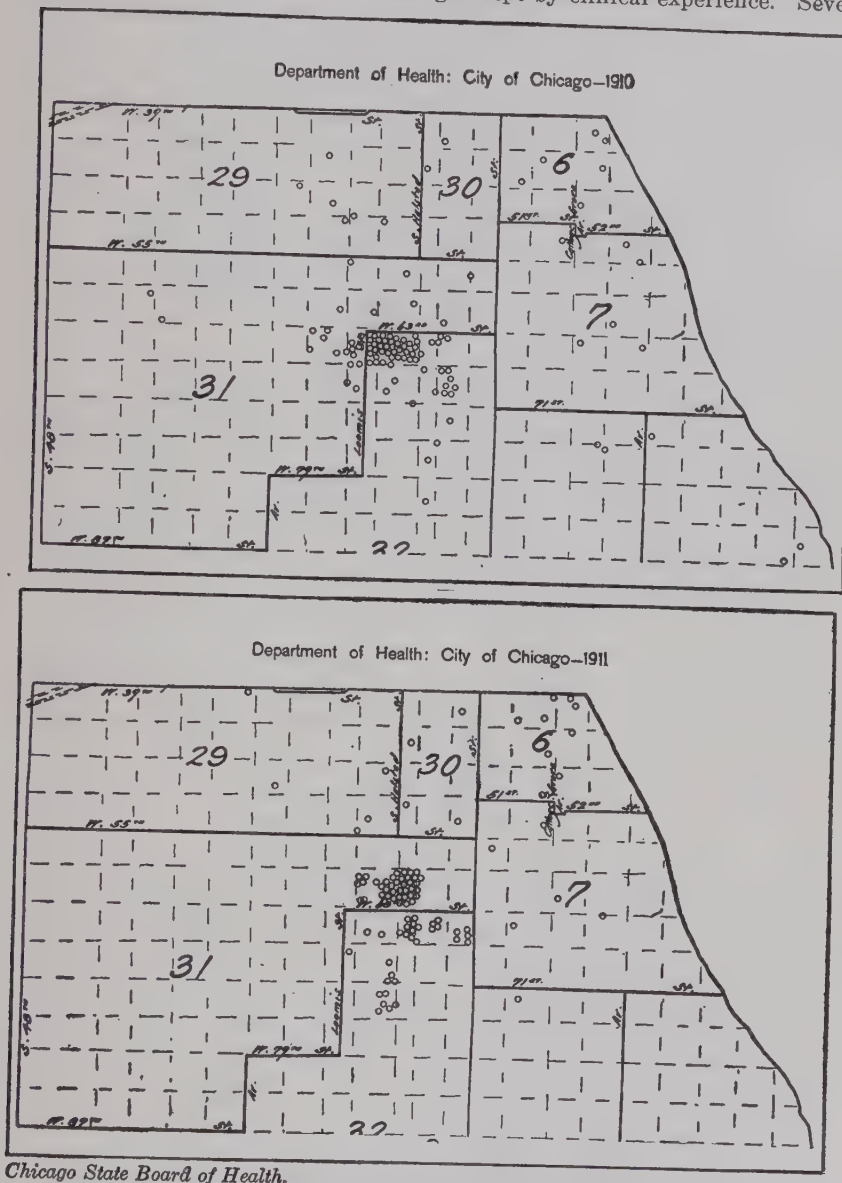
REPLY.—It is unsafe to draw any conclusion from experiences of thirty-eight years ago. I know of no health officer anywhere in the world, charged with the responsibility of preventing smallpox, who does not use vaccination. These men have had large experience. I do not believe that anyone would hesitate to give his opinion greater value than the opinions of men who, so far as this proposition is concerned, are merely speculators and theorizers.

Blood Test for Vaccination.—*E. F. P. asks: "Has the blood ever been examined after vaccination against smallpox has taken effect? If visible changes are produced are they the indication for how long a time vaccination is a preventive of smallpox?"*

REPLY.—The blood has been carefully examined after vaccination against smallpox. There are no visible changes. There is no way known at the present time to measure immunity against smallpox except the clinical way.

The clinical way is to try vaccination. If it fails, say twice, in a person previously successfully vaccinated, immunity can be inferred. This is the method of testing immunity employed by health departments.

Anyone immune as shown by this test is allowed to visit in the wards of the smallpox hospitals. This does not tell how long the immunity will last. Nor is there any way of telling except by clinical experience. Seven



Chicago State Board of Health.

FIG. 105.—LOCALIZED EPIDEMICS OF TYPHOID DUE TO MILK; 1910 AND 1911. Each small circle represents a case.

years is a safe limit of trust in immunity from vaccination. Some people will remain immune for, say, twenty years. Most people will be immune for ten years. But the safe assumption is that immunity from vaccination does not last more than seven years.

Smallpox and Vaccination.—*V. A. M. writes: "Some parts of the Illinois valley have the misfortune to have threatened epidemics of smallpox. Are there any serious objections to vaccination? Can it be the source of other diseases? At what distance can the contagion be transmitted—that is, how close to an affected person can one venture with safety? Do fresh air and sunshine kill the germ? What precautions are advised in addition to vaccination or to those who object to it? What constitutes 'exposure' to it?"*

REPLY.—1. No.

2. No.

3. If successfully vaccinated recently he can sleep in the bed with him with safety. If not, he should stay at least two hundred feet from a case, or from anyone who has been in contact with a case, except that the person in contact knows how to disinfect his hands and his clothes, and has done so.

4. Yes.

5. No precautions are required except vaccination.

6. Contact with a case, touching him or his clothes or getting within a short distance (say five feet) of him. Two hundred feet is an extra precaution. Unvaccinated communities sooner or later pay the price.

Amputation and Vaccination.—*E. T. writes: "My little boy was successfully vaccinated a year ago. A few months ago he had an accident and lost his left arm (where the vaccination scar was). Shall I have him vaccinated again? If so, where?"*

REPLY.—A successful vaccination changes the entire body so that it is protected. He need not be vaccinated again for six years. He is in no danger from smallpox. Get a certificate from the vaccinator. Use this as your proof.

SCARLET FEVER

HOW SCARLET FEVER SPREADS

Scarlet fever spreads from mouth to mouth and the mouths cannot be very far apart either, in point of time or in distance, else the disease will not spread.

Every hour that elapses from the time the secretion leaves the mouth of the sick and until it gets to the mouth of the catcher gives sunlight, air and drying a chance to kill the contagion. Every hand, every cloth, every table that it touches bars it away from its chance of getting to the mouth which it can harm. It is no aeroplane or flying machine; it must be bodily carried from sick to well.

In some German and English hospitals which treat scarlet fever in the same large room with children convalescent and sick from other diseases, there is a wall six feet high between the scarlet fever and the other cases. But what gives the result is that no hand, no thermometer, no towel, nothing of any sort which touches a scarlet fever case touches any other case until it has been sterilized. The isolation, from the scientific standpoint, is complete—and complete scientific isolation is what is essential for the control of scarlet fever.

The death rate in hospitals is always lower than in homes. It gives the well children a chance to escape catching the disease. But it is a waste without warrant to have a hospital for scarlet fever alone.

When a community with a smallpox hospital has no smallpox, but does have scarlet fever, let the hospital be used for the disease they have. It is safe. The hospital will not spread scarlet fever, smallpox, diphtheria, measles or whooping cough. The building, the room, the bedding, can be used first for one and then for another. It may be necessary to change the nurses, physician and attendants, but not the building.

DEVELOPMENT OF SCARLET FEVER

Six days after exposure a child in whom scarlet fever is developing will have a rise of fever and a sore throat. One day later a fine scarlet rash appears in most cases. Usually the rash fades in seven days and scaling of the skin begins in eight days. The throat is red and sore while the rash is out and it continues red, swollen and boggy for days after the rash has disappeared.

The great mistake which we make in handling scarlet fever is in paying too much attention to the rash and too little to the throat. Many of the cases never develop a rash at all, but they do get the sore throat. The throat is the thing to watch.

When the patient is recovering again we have judged by the rash and the scaling as to when the quarantine should end. Again the throat's the thing. Watch the throat.

In trying to decide what spreads contagion, we have searched the "scales." Again the throat's the thing to watch. Recent moist mouth discharges, mouth spray, sputum, and "droolings" convey the contagion.

We know little about the germ which causes scarlet fever. We know less about experimental scarlet fever than we do about experimental measles. But from the practical standpoint we know this much:

A patient having scarlet fever is infectious from the first sore throat to the time when the tonsils are no longer boggy and swollen and all discharges from the nose, ears, and throat have stopped.

People who have been in contact with cases can occasionally spread the disease through their mouth and nose secretions.

Cases with sore throat and without rash can spread the disease as readily as those who have had it.

Dried secretions are not very apt to spread the disease.

SCARLET FEVER AND HOT HOUSES

About the first of January a man told a friend he was going south for the remainder of the winter. The friend casually asked, "Are you going away to escape the cold?" "No," replied the first speaker, "I am going away to escape the heat. Houses in New York in winter are too hot to live in. I am going to Florida where the outside air and the rooms are cooler than the rooms in New York."

The business man in Chicago spends more than three-quarters of each

twenty-four hours inside a house—and houses are warmer in winter in Chicago than in New Orleans.

School children in Chicago live in air which is several degrees warmer than that of school and living rooms in New Orleans.

When we know this we do not wonder that there are few deaths from scarlet fever in New Orleans, Richmond, or any southern city.

I wonder if the public generally knows that the scarlet fever death rate mounts as we go north from Mobile with a rate of 3 per 100,000 to 5.3 in Memphis, to 9.6 in Louisville, to 18.4 in Chicago, to 30.2 in St. Paul, and possibly a higher rate in Canadian cities.

Scarlet fever is a cold weather disease, because houses are hot when the scarlet fever weather is cold.

It is a cold climate disease, because children are closely housed in the cold climates. The moral is that when living rooms are as cool in the upper Mississippi valley in February as they are in Richmond, the scarlet fever rate will begin to drop and as the number of foci of the fever decreases the drop will continue.

The moral, so far as the individual child is concerned, is that it be kept out of hot rooms.

The moral for a child sick with scarlet fever is that it be kept in a cool, well ventilated room.

In the spread of scarlet fever the throat secretions are of great importance. Possibly scaling skin is of some importance. But do not forget hot rooms and staying indoors.

MYSTERY OF SCARLET FEVER

Scarlet fever is a disease of mystery. Strange to say, its cause refuses to be discovered in spite of the large amount of money that has been spent on it and the great amount of brains and energy employed in scarlet fever research. No bacillus has been found which is the cause in diphtheria and no filterable virus as in measles.

That the infection gets into the nose and throat, that poisons circulate in the blood and thereby reach the skin and kidneys as well as structures which react less to them, that after a certain time the disease ceases to be active whereupon the badly poisoned cells are shed—these observations are so easily made that they are not disputed. That the disease belongs in the group of contagions of the type caused by microörganisms is but little questioned.

For some reason atmospheric temperature plays a prominent part in it. It abounds in winter and decreases in hot weather but enough lingers to carry the seed over from winter to winter. In climates where the outside air is cold and the room air is hot, the scarlet fever rates are high. In those such as New Orleans, where the outside air is balmy and the room air is frequently too cool for comfort the scarlet fever death rates are not high. The mothers of Kentucky, South Carolina, and Mississippi know nothing of the dread of scarlet fever felt by the mothers of Wisconsin and Minnesota.

It has been suggested that in the gulf states the people have scarlet fever

so mildly that it is not called scarlet fever. It is only the rare and highly exceptional case that develops symptoms that mark it plainly as scarlet fever. It is only the rarer epidemics in which the cases are typical.

Scarlet Fever Incubation.—*R. W. S. writes: "Would you kindly state the period of incubation for scarlet fever? Is scarlet fever contagious during the first stages of the disease? Can dogs or cats act as carriers of the disease?"*

REPLY.—1. Usually three to four days; occasionally one day; occasionally one week.

2. Yes.

3. Possibly.

Definition of Scarlatina.—*J. W. W. writes: "Will you please tell me the difference between scarlet fever and scarlatina?"*

REPLY.—The first is the English name, the second the Latin name of the same disease. There is absolutely no other difference. One does not describe a mild and the other a severe form of the disease, a wrong belief that leads many to neglect proper quarantine precautions in what they think is the milder form.

Reporting Scarlet Fever.—*Anxious Mother writes: "My baby has had scarlet fever for the last three weeks and has started to peel very slightly on his head, feet, and knees. Let me know where the contagion lies, because I have another child 3½ years old. I keep him out of the house, but he comes every day and begs to be let in. Would I do anybody harm if I should take a walk in the evening and talk to people standing a little distant from me? My doctor has not reported the case. Should I report it now to the board of health and must I be locked in for six weeks more?"*

REPLY.—You should insist upon your doctor reporting the case to the health department, or you should report it and the department will send out someone who will tell you just what to do, and will also disinfect your house when the child is well. The quarantine generally lasts from four to six weeks from the beginning of the disease. If you report it now your quarantine will last but a short time and you will know that you have not been the means of spreading the disease. If you keep away from your other child and do not let him come home until the house has been disinfected the chances are he will not get it.

Obey Health Board.—*Mrs. W. P. C. writes: "My family has been in quarantine for seven weeks, owing to scarlet fever, and the child who had it is still scaling off on the feet and on the hands. She has scaled off three times already. I wish to know if this last scaling is dangerous, and if it would be all right for the family to get out of quarantine."*

REPLY.—If the throat and nose are well, if there is no discharge from the ears, the peeling may be disregarded. By all means obey the instructions of your health board, charged as it is with the responsibility of protecting your community. But call its attention to the more recent writings on the subject; for instance, Chapin's "Sources and Modes of Infection," or Hill's articles in the *Canadian Public Health Journal.*

Scarlet Fever in School.—*"Interested Neighbor" writes: "At the Langland school there have been several cases of scarlet fever, and it seems to be spreading more every day. There have been cases of children peeling in school. This is from the doctor's own lips. Now, if you go to a house where there is a scarlet fever case, you tack a sign on the door, and all but those in attendance must leave or you quarantine them. Since there have been three cases found in school, I propose the closing of the school and having it thoroughly fumigated."*

REPLY.—To close a school and disinfect it as a method of preventing the spread of scarlet fever is not good practice. When it has been tried it has failed. Scarlet fever is spread by people, not by desks and walls. Children "peeling" in school are the spreaders. A good quarantine and close inspection will control the epidemic.

Hot Baths in Scarlet Fever.—*H. M. B. of St. Louis writes us advocating the use of almost continuous hot baths in the treatment of scarlet fever. He illustrated its benefit by relating many severe cases, some in his own family, which rapidly improved and subsequently recovered following the repeated use of hot baths. The baths are given as hot as the hand can bear. He concludes by asking how can a better, surer treatment be devised?*

REPLY.—Hot baths in scarlet fever will be of great service. It will remain one of the best agents until the scarlet fever germ is discovered and some form of specific treatment is worked out. That will be a better way—it is not yet in sight.

Scarlet Fever Danger.—*J. R. W. writes: "Is there any danger of a child contracting scarlet fever from another child with whom it has played in the open for several days before the disease was known? Is there a safe treatment to immunize the child if there is any danger of contracting the disease?"*

REPLY.—1. If you mean before the child was feverish and "broken out," no. If you mean that the throat was sore, the eruption out, the patient with fever and pains but no diagnosis made, yes.

2. No.

Scarlet Fever Contagion.—*S. F. writes: "Would there be any danger of taking scarlet fever by passing through the entrance of a flat building when the family in the lower flat have the disease?"*

REPLY.—No.

Disinfection After Scarlet Fever.—*F. J. H. writes: "What is the latest and most approved method of fumigation, particularly where scarlet fever is prevalent? That the use of formaldehyd is not efficacious has been many times demonstrated in families where one or more children—not exposed originally—were taken away from home until after the disease had run its course in the case of the patient quarantined and then brought home after the quarantine had been lifted and the premises pronounced thoroughly fumigated, only to come down with the disease within ten days after returning home. Will any method of fumigation which will destroy the fever germ or render it innocuous be harmless to insect life confined in the same room or rooms?"*

REPLY.—Formalin is the best disinfectant. It does not kill insects. Sulphur fumes do kill insects, but are not so effective as a fumigating agent. The fact that cases of scarlet fever have developed after children had come back does not mean that the houses were not properly disinfected. It means that the houses were disinfected before the patients were safe. Sometimes the patients were still scaling. Usually they still had running ears or nose discharges or swollen tonsils. It is the partly cured patients, not the houses, which spread disease.

Contagiousness of Scales and Disinfection.—*S. T. O. writes: "(1) Is it generally accepted that scarlet fever is not contagious during the desquamation period? (2) What is now considered the best way to disinfect a room after a contagious disease?"*

REPLY.—(1) No. The better posted physicians hold that the scales do not spread the disease. By reason of throat secretions the patient may be, and often is, infectious during the scaling period.

(2) Thorough washing, sunning, and airing. Now that New York has stopped fumigating, other cities will probably stop also.

Scarlet Fever Aftermath.—*G. M. writes: "(1) Does scarlet fever leave any ill effects and, if so, what? (2) How long after recovery may a patient play ball, swim, or dance safely?"*

REPLY.—1. Yes. Some of the more important are deafness, Bright's disease, heart disease, and rheumatism. Bright's disease and infection of the ears generally follow promptly; rheumatism moderately so, but heart disease is generally not recognized for several years afterward.

2. Let him be guided by his feelings. Have him start easily and increase the task as fast as his soft, mushy muscles will allow.

DIPHTHERIA

Diphtheria is due to the diphtheria bacillus. This bacillus was discovered by Klebs thirty years ago. Seven years later von Behring discovered antitoxin, and eleven years later, in 1894, Roux made practical use of this substance in treating the disease.

We know the cause of the disease and its every habit. We know the remedy, how to make it, and how to use it. We have had this information for from nineteen to thirty years. Yet there is some diphtheria.

We think there is an appalling amount, and maybe there is; but the middle aged people will tell you that the present amount is trivial as compared with that in the '80s and '90s. Why diphtheria is still with us will be told later on.

The diphtheria bacillus enters the body at some one of the openings. It does not belong in the human body, and it ventures in with great fear and trembling.

There are four openings into the body. The diphtheria bacillus rarely enters any except the nose and mouth. The nose as the port of entry is of little importance as compared with the mouth. The bacillus can be carried in with the inspired air.

The usual method of entry is from the fingers, pencils, toothpicks, spoons,

toys, handkerchiefs, and towels to the mouth. The bacilli that stop in the front part of the mouth are washed out by the saliva. Those that get into decayed teeth, into folds in the lining membrane, and into the pits in the tonsils stay where they locate.

The bacillus rarely gets farther in than the tonsils. Occasionally it gets into the windpipe; rarely it gets into the bronchial tubes; still more rarely it gets into the lungs. It may travel down the esophagus or gullet to the stomach, but that is exceedingly rare.

We see that the bacillus does not venture far into the body. It can only travel a few inches down or up these natural tubes. Of course, a diphtheritic patient is swallowing bacilli constantly, but those swallowed are killed by the body juices.

The bacilli do not get into the blood. They secrete poisons which are absorbed, but the bacillus itself never gets into the blood stream. The bacilli do not travel far in the lymphatics. It is rare for them to get into the lymphatics at all, but those that get in are stopped by the nearest lymph glands.

One of the ways of telling diphtheria is the swelling of the glands on the outside of the face and neck.

These glands swell because they are working hard to neutralize the diphtheria toxin and to filter out the pus cocci that get in through the diphtheria wound.

We have said that there are four gates into the body. The gates having been passed, there are three routes beyond—the tubes, the blood vessels, and the lymphatics.

We have said that the bacillus has no capacity to travel up or down the tubes. When it starts toward the blood vessels and lymphatics it is quickly stopped. What is the reason?

The diphtheria bacillus is a most virulent germ. It sears as a red hot iron whatever surface it touches. When it locates in a pit in the tonsil it kills every cell in its neighborhood.

When a red hot iron sears a surface a healing serum quickly oozes out. When the diphtheria bacillus sears the surface a healing serum also oozes forth, but the bacillus cooks and coagulates this serum as well as the cells.

This coagulated, gray, dirty, bleeding membrane, called the diphtheritic membrane, is composed of coagulated serum and cells. This clot stops up the lymphatics and blood capillaries and walls off the diphtheria bacilli.

That is the reason why the diphtheria bacillus stays on the surface where it locates and does not travel far. But, though caught in this net, it does not die or become inactive.

The diphtheria bacillus secretes a poison called diphtheria toxin. This poison enters the lymph channels. The lymph glands remove as much of it as they can. The blood dilutes it.

The solution of toxin as it circulates in the blood is not so violent because not so concentrated as where it entered. By the blood it is carried to the different parts of the body.

It poisons whatever it touches, but it poisons certain cells more than others. It markedly poisons the heart, its nerves, and its nerve center.

In consequence the pulse is rapid out of proportion to the amount of fever, and paralysis of the heart is an occasional result.

It poisons the nerves, and in consequence the weakness is out of proportion to the fever. Paralysis due to neuritis, or an overpoisoned nerve, is an occasional result.

The amount of poisoning not only depends on the patient and on the bacillus, but it is also greatly influenced by the location of the bacillus. If it is on the tonsil that gland protects the balance of the body. The tonsil is one of the best places to have diphtheria.

On the other hand, the nose is a bad place to have it. The poison is poured right into the blood when the disease is in the nose.

The windpipe is a bad place to have diphtheria, not because of the large amount of poison absorbed but because of the danger of choking. The space between the vocal cords is so small that not much room is left when a diphtheria membrane is present.

The diphtheria poison is moderately hard on the kidneys. Acute Bright's disease is occasionally present, but it is not of as much importance as it is in scarlet fever or pneumonia.

In diphtheria the disease generally starts within two days of the exposure. There is pain in the throat. This pain is much less than in ordinary follicular tonsillitis. There is some fever, 99° to 101°, but it also is much less than in follicular tonsillitis. There is some general aching, but that also is less than in the less severe forms of sore throat.

When the tongue is pressed down the back of the throat is red and a gray membrane is seen. A little later the glands of the neck around the ear and the angle of the jaw are seen to be swollen. The pulse is ten beats higher than one would expect with a fever of that degree in a child of the age of the patient. If the disease extends into the windpipe the child will show signs of obstruction to breathing.

This is about as much as can be said about the way to know diphtheria when one sees it.

When eighteen years ago it became the rule to make a microscopic examination of the throat the microscope commonly showed that these "sensed" diagnoses were right. It was not for some years that the other side of the picture began to show up.

That other side was this: A large part of the sore throats that the clinical diagnosticians had said were not diphtheria the microscope showed to be diphtheria.

When the physicians began to run down the cause in every case of diphtheria they soon came to the conclusion that sewer gas, garbage dumps, leaky drains, and bad gutters could not cause the disease. When these causes were ruled out they were left hanging in the air.

The day of mysteries was past. A cause must exist. To find that cause they began to examine the throats of all the people who had been in contact with the sick one for several days before the illness began.

This search led to a discovery. The discovery was that the diphtheria bacillus often caused follicular tonsillitis, the tonsillitis with the white patches in the throat.

Soon it was found that the diphtheria bacillus could cause the simple

sore throats without any membrane or patches of any sort. Soon after this it was found that the diphtheria bacillus could be present in the throat without causing any soreness or any symptoms of any sort.

The conclusion was that the only test that could be depended on was the bacteriological test.

This does not work the hardship that one might think. To make a throat culture is easy. Laboratories to examine these cultures are everywhere. The states now provide laboratories with branches in different places. The cities now provide laboratory facilities with branches scattered everywhere.

In addition a large percentage of the physicians are equipped to examine for this bacillus. If a town has not an equipment at the city hall it could easily and inexpensively provide one in the public school.

Some would object to doing this work in the public school on the ground that it would endanger the pupils. The objection is theoretical. A few epidemics among laboratory workers are on record, but the number is small and the deaths have been few.

I think it was Havelock Ellis who wrote of the disadvantage of having a cure for a disease. It had sometimes operated to cause a spread of the disease. The knowledge that one could be cured made people less careful to avoid it.

The people of today cannot understand the dread of diphtheria that prevailed up to ten years ago. They are still afraid of it, but the fear has diminished to the point where it has ceased to be much of a deterrent.

Antitoxin has been reducing the death rate, but it has been pulling against a fearful load. There are more cases of diphtheria now than there were twenty years ago.

Several years ago health departments inaugurated a policy that has made the control of diphtheria more difficult. For several years it has been the policy to inject the children in the family with about 1,000 units of antitoxin each. This makes it impossible for them to contract diphtheria for about a month or perhaps for six weeks. In the meanwhile the sick child will be well and the danger will be past.

The plan works all right so far as that family is concerned, but it works all wrong so far as the neighborhood is concerned.

Antitoxin prevents the child from getting sick with diphtheria. It does not prevent diphtheria germs from getting into his throat and staying there for six weeks or more.

Antitoxin, as its name implies, is an antitoxin and not an anti-bacterial substance.

In the old days the family tried mighty hard to keep the well children away from the sickness. They sent them away at considerable expense or got some neighbors to take them, or kept them well away from the sick children even for weeks after the illness.

They did not need watching to see that they carried this out. They knew that if it were not carried out it meant other sick children.

Now they give a prophylactic dose of antitoxin, and they know the children to be fairly safe. They are therefore less careful in carrying out quarantine.

Within the last year or less von Behring, the man who discovered antitoxin in 1890, discovered a way of vaccinating against diphtheria that he claims protects not only the children in the family but the children of the neighborhood.

When the health department inspectors get out to run down a diphtheria epidemic now they examine bacteriologically the throat of every person who has been thrown with the sick one. They have been doing this now for several years.

They have discovered several things. One is that after diphtheria has been diagnosed and quarantine has been established the sick person rarely gives it to anybody. So long as he is lying in his bed violently sick he does not infect anybody.

Another is that those dead of diphtheria do not infect anybody. The present method of embalming and of conducting funerals in deaths from contagion amply protects the community.

Another discovery is that diphtheria is spread by convalescents. The most important discovery is that the great bulk of the diphtheria is spread by persons who are but mildly sick, and especially by persons whose sore throats look just like ordinary, everyday sore throat.

So far as the treatment of the disease is concerned, there is but one procedure of any consequence. That is to give plenty of antitoxin. The antitoxin is given to neutralize the toxin.

As the amount of toxin increases each day of the disease, the dose of antitoxin must vary with the stage of the disease, not the size or age of the patient. 2,000 units may be enough and usually is enough if the throat has been sore less than a day.

It would be much too little for the second day and would be of no service on the third day.

5,000 units is little enough on the second day, and 10,000 on the third. If the patient is choking it will be necessary to use a tube in the larynx.

ALMANAC TALK ON DIPHTHERIA

On diphtheria, the Virginia Almanac speaks as follows: "THIRTY YEARS AGO AND NOW. Around the tea table, after the custom of the sex, they had been discussing the maladies of their children.

"'It's simply wonderful,' said the distinguished authoress, 'what science has done to overcome diphtheria. I remember, thirty years ago, when I was a child—yes, quite small, thank you—one of my sisters had membranous croup. It came very suddenly and brought terror to our hearts. In twenty-four hours my sister was dead.

"'Now—just think of the contrast! My little boy had diphtheria last winter, and, when the doctor said it was a very bad case, my heart sank. I had not forgotten that other tragedy in the family. But he gave the child antitoxin at once, and, in a few hours, the boy was practically well.

"'Of course, ladies, much depended on giving the antitoxin promptly, but to tell you the truth, I had far rather for my child to have diphtheria than measles or whooping cough.'

"Diphtheria is an acute, contagious disease, due to a germ which

comes from patients who have the disease. Within three days after the patient is exposed the nose, the throat or larynx becomes inflamed, and is gradually covered by a 'membrane,' or grayish patch. Without antitoxin the course of the disease is very severe, and may be accompanied by heart failure or paralysis. The mortality varies much, ranging as low as 50 per cent. in very severe forms.

"Antitoxin is a sure cure for diphtheria, but its efficiency is directly in proportion to the promptness with which it is used. Any delay means danger; long delay means death.

"Isolation is necessary to prevent the spread of diphtheria. Mild cases and cases which show no outward symptoms spread the disease. No case is allowed under the law to leave the premises until an examination shows the germs to have disappeared from the throat.

"Antitoxin is to diphtheria what sunshine is to snow.

"A syringe of antitoxin is better than volumes of advice.

"The physician who delays giving antitoxin belongs with the man who waited till the house burned down to put out the fire.

"A sore throat in diphtheria season is as suspicious as a strange negro in a hen house.

"Great epidemics from little sore throats grow.

"Take no more chances with diphtheria than with a coiled rattler."

Carriers of Diphtheria.—*B. B. of Flat Rock, Ill., writes: "We are having an epidemic of diphtheria. Rabbits are found dead in many places. It is charged that rabbits carry the disease. Is there anything in this?"*

Reply.—From time to time it has been claimed that the lower animals, and particularly chickens, spread diphtheria. Bacteriological studies have not confirmed these claims. My advice to you is to have a local physician inoculate a test tube from the throat of a dead rabbit and then send the rabbit and the tube to the State Board of Health, Springfield, Ill. But the chances are at least 99 out of 100 that the diphtheria in Flat Rock is being spread by people. Quarantines should be established at once. Every person found with diphtheria bacilli in his throat should be quarantined whether sick or well. Probably as much diphtheria is spread by "carriers"—that is, people who are well but who have bacteria in their throats—as by people who are definitely sick. If, say, ten people came in contact with a case of diphtheria somewhere about four of them would get the disease, about four would be "carriers" for a few weeks, and about two would wholly escape. Concentrate your control on people. Incidentally investigate rabbits.

What Croup Is.—*P. B. writes: "I am one of nine children, none of whom ever had croup, so I know nothing of it. My wife is always warning me about what to do if our children get it. Does the eating of heavy food at night have anything to do with it?"*

Reply.—Croup is an ordinary cold located in the windpipe, with some swelling and some nervous spasm as a complication. The air tubes are irritated by the "cold," and they contract and become smaller in certain places.

Certain nervous children develop this feature when they catch cold. Other children do not. It is often a family peculiarity.

The eating of heavy food at night might have some indirect effect.

Croup should not be confused with diphtheria, which it often resembles. Many children die with diphtheria because their disease was called croup for the first few days.

To Get Rid of Bacilli.—*L. B. writes: "Please inform me how to get rid of diphtheria bacilli. We have a case in our family."*

Reply.—Various methods have been used. One is to apply some violent antiseptic to the crypts of the tonsils. Nitrate of silver, iodin, and carbolic acid have been used for the purpose. A wash of antitoxin and a dry antitoxin powder have been used.

Either the health department or your family doctor can help you. A good discussion of the subject can be found in the *Journal of the American Medical Association.* The paper was read by Professor Albert of the University of Iowa. Professor Ravenel of the University of Wisconsin and a gentleman from the University of Minnesota reported cures.

CROUP IN CHILDREN

Time was when we spoke of membranous croup as a separate disease. It is now known that membranous croup is due to diphtheria. The term "croup" is now used to mean an ordinary cold—nose, throat, or bronchial tube cold—accompanied by an element of spasm. The very important point to determine is whether the croupy child has diphtheria. If it has diphtheria, antitoxin must be given quickly and the child must be isolated.

If it is an ordinary croup, antitoxin should not be given; isolation need not be strict. The tendency will be to overmedicate, overnurse, and overcare for the sick one. Pretty important point to decide, then, is it not? The important questions to answer quickly are these:

Is there diphtheria in the neighborhood?

Is there much sore throat among the child's playmates?

Are there kernels in the neck?

Can anything be seen on the tonsils?

Is the child subject to croup?

Is this attack of croup acting like other attacks?

Ordinary spasmodic croup is not so serious as it seems. A good dose of salts followed in four hours by a dose of castor oil should be given. Ordinary care for a common cold, carried out in a well ventilated, well warmed room, will be all that is needed for the ordinary case.

Croup is usually overtreated. The children are made worse by being fussed with too much. They are wrapped up too much and the sick room is sealed too tightly.

If the breathing gets very tight give a teaspoonful of sirup of ipecac. This can be repeated if necessary. The important point to decide is which of these cases is suspicious enough of diphtheria to make it imperative to have a throat culture. We will make headway when parents can and do make throat cultures.

MEASLES

Bulletin 109 of the Census Bureau tells us that in 1910 measles caused a death rate of 12.3 per 100,000 population in the registration area. It further says it is true that many deaths assigned to other causes are due to the unfortunate consequences of this disease.

In nursing babies it is more fatal than diphtheria or scarlet fever. Health officers have more trouble holding a measles epidemic in check than one from any other disease, simply because people are not afraid of measles. If fear does harm in some directions, lack of it does harm in others.

Whether it be measles or money, diphtheria or riding on the train, scarlet fever or running a store—fear that leads to intelligent precaution is to be applauded. Fear that leads to useless worry is to be condemned.

Measles begins with a fever and the other symptoms of a severe cold. Four days later the eruption comes out; after two days it fades away, the fever goes, and convalescence is established. When this, the normal course, is interfered with it is because, secondarily, an infection of the lung (pneumonia), or of the kidney (acute Bright's disease) has come on. The germ gets into the nose and from there goes into the blood. The germs are spread from the time the first symptom starts until the fever drops.

The important point to remember is that it is contagious before there is any symptom which is clearly distinctive—during that four days before the breaking out comes. Therefore, all children with colds and fevers should be excluded from the schoolroom and isolated at home.

Dr. Chesley of the Minnesota Health Department says that when an epidemic of measles is on the children of the public schools should be superficially examined each day. Children in the incubation stage of measles will show measles patches in the back of the mouth in advance of any eruption on the skin.

The superficial examination which he recommends consists of observation as to red eyes, coryza and patches in the mouth.

Perhaps a still better plan in time of measles epidemic would be to exclude all children with acute colds from schools for four days.

To close the schools is a bad method of controlling measles.

Measles Not Universal.—*Anxious Mother writes: "Why does Chicago go to the expense it does, if the measles is a universal disease and all children should have it? What is there to this disease or its after-effects to make the city so careful?"*

Reply.—Measles is not a universal disease. Most careful mothers, living in towns with good government and good public sentiment, raise part of their children and some raise all their children without their having had measles. The measles death rate in the North is about two-thirds as high as that of scarlet fever. In the South it is higher. These are two sufficient reasons.

In Cases of Measles.—*W. H. W. writes: "1. In case of measles in a school, but one case being found, what procedure would you follow to prevent an epidemic?*

"2. In case of measles in a home, is it necessary that the children be kept in the house, that is, off the sidewalk about the house and away from adults or other children who have had the measles?

"3. May children who have had measles and are in the second week of convalescence take walks about the residence part of the town pro-

FIG. 106.

vided these children are not allowed to come in contact with or associate with anyone who has not had the measles?"

REPLY.—1. If it is the first case in town or in the neighborhood exclude the child. Exclude all children who have ordinary colds during two weeks following the exclusion of the case. If a crop of cases develops after this first contact close the school. If the epidemic has run beyond this stage closing the school accomplishes nothing.

2. Yes, except as to the nurse. The nurse must keep away from everyone except the sick child. The isolation must start with the first sneezing, the onset of the disease, and be kept up until the fever has gone.

3. Yes.

Conveying Measles.—*C. H. S. writes: "1. Can a third person who has had measles convey the disease to others if living in a home where*

the disease exists? 2. Is it safe for children (who have had measles) to continue attending school from a home where younger children are suffering from this disease where no isolation is observed? 3. Is a discharging ear ever caused by teething in the child?"

REPLY.—1. Yes, if he comes in contact with the case.
2. No.
3. No; a discharging ear means infection has traveled from the throat to the ear. Discharging ears in children is the usual cause of deafness in old people.

Susceptibility to Measles.—*S. H. writes: "A young woman who grew to womanhood without having the measles, although she was exposed many times to the disease, thinking she was immune, visited a house where there was a case of measles. Later her throat became sore, but no rash broke out. A doctor said she had measles. Do you think his judgment was correct?"*

REPLY.—Probably, yes. Occasionally a person has measles a second time. Occasionally a person seems to be immune to measles for years and then becomes susceptible. More frequently the reverse is true. I have known of persons never vaccinated failing to contract smallpox on one exposure and later contracting it from a less intimate exposure.

Time of Contagion in Measles.—*M. writes: "After the eruption in a case of measles has disappeared, how long is there danger of contagion (1) from the patient; (2) from the attendant or nurse; (3) from the sickroom where ordinary cleanliness is observed but no fumigating is done?"*

REPLY.—(1) The present day teaching is that the danger is greatest before the eruption, in the fever and coughing stage; is not very great after the eruption appears; is slight after the eruption fades; and has disappeared entirely by three days after the fever and breaking out has gone.

(2) The nurse who covers her clothes with a gown and washes her face and hands as she leaves the sickroom is not dangerous during the illness and certainly not after the illness has subsided. Unless she follows this plan scrupulously she is about as dangerous as the patient.

(3) Ordinary cleanliness does not accomplish much. If the room and its contents are scoured with soap and water and then thoroughly aired and sunned the danger will be ended as soon as the process is finished.

Open Window No Danger.—*L. M. writes: "(1) If a person visits a house where there is a case of measles and comes in contact with the case, how long afterward would that person be likely to spread contagion? (2) Would he be safe after a month? (3) Does the health department insist on fumigation after a case of measles? (4) [a] Are people in quarantine allowed to have windows open, and [b] is there any danger of contagion as in cases of scarlet fever, etc., in passing a house where the window is open?"*

REPLY.—1. A day or less.
2. Yes.
3. Some do; some do not.
4. [a] Yes. [b] No.

German Measles.—*L. S. L. writes: "1. Have German measles any connection with common measles? 2. Are they contagious? 3. If so, after what period is danger from contagion passed? 4. Can they be spread by others than the person affected? 5. Are cases quarantined in Chicago, or are persons living in same house prevented from going about?"*

Reply.—1. No.
2 and 3. Yes, about seven to ten days from first symptoms.
4. Possibly also by "close contacts."
5. If they are not in contact with the sick, no.

WHOOPING COUGH

A Harvard professor has found the germ of whooping cough. That discovery by itself is of no more importance than the discovery of the South Pole. What will make the discovery worth while will be for scientists to grow this germ and watch it as a farmer does his pigs. Presently the scientists will be able to tell us all about the habits of this germ; then some simple, working, everyday methods of microscopic diagnosis will be published.

When these methods come into general use we will, no doubt, find that many cases of whooping cough never whoop and that some of the cases that now develop like lightning out of a clear sky will be explainable on the ground of contact with carriers or with atypical cases. Then the scientists will inject the germs into some susceptible animals and, next, they should get a curative serum, and, eventually, a preventive vaccine.

In the meanwhile, the methods of controlling whooping cough all down the line are crude and unscientific. If it is cure, there is nothing to do but let them whoop it out. If it is diagnosis, the only certain sign is the whoop. When that is present anybody can diagnose the disease, and, when it is absent, nobody can. One man's guess is as good as the next man's. When it comes to handling the disease from the standpoint of prevention, the same crudity and uncertainty prevails.

Fortunately, practically all the grown people have had it either in a plain or a masked form and they are not susceptible to it. Children after babyhood are not endangered by it.

The disease is a monumental bluffer. An affected boy may be whooping so as to frighten his mother stiff one minute and the next he will be turning a handspring. But nursing babies are killed by it, and by the thousand.

Out of this difference in the susceptibility of various groups of people has grown a suggestion that should prove of great value in controlling this disease and of some value in controlling other diseases. It is to tag the patient rather than the house. Say tag both the patient and the house from the time the diagnosis is made until ten days later, then let the child go out with the tag conspicuously displayed.

In old Bible times they followed that plan with the leper. A conspicuous card reading: "I have whooping cough" in these days should be as

efficacious as the cry of "Room for the leper" in the days when men could not read. Under such a plan the babies could be kept away from the "whoopers" and the "whoopers" would get well quicker by reason of air and exercise. Under this plan attention would be concentrated on the person and taken from the house. All experience demonstrates the advantage of such a shift of attention in controlling smallpox, scarlet fever, diphtheria, infantile paralysis, meningitis, and measles, as well as in whooping cough.

The Census Bureau reports that the whooping cough death rate in 1910 in the registration area was 11.4 per 100,000 people of all ages. It further says that, as with measles, these figures give no idea of the real harm from whooping cough, since the deaths of children from whooping cough are frequently recorded as from pneumonia and other complicating diseases. When we remember that whooping cough kills none excepting nursing babies, and then compute how small a part of the total population is under two years of age, we can understand the mothers' dread of this malady.

It starts as an ordinary cough and, for ten days, cannot be told from a simple bronchitis. About the sixth day the cough gets worse and, by the tenth, whooping begins.

The germ is found in the nose and throat secretions from the first coughing spell until the whooping gets under way. After that state (whooping) is established, it is not possible to find the germ which is held to be specific.

Since it is not very dangerous to any except nursing babies the first essential is to keep nursing babies away from it. Whooping cough quarantine is usually pretty poorly carried out. There is little hope of a good quarantine. This is all the more reason why a nursing baby should be carefully shielded. The epidemiologic points to be noted are:

1. All children with coughs should be kept away from all coughing children.

2. All babies should be scrupulously kept away from all coughing children.

3. The isolation (quarantine) of cases of whooping cough should begin as soon as the cough starts (ten days before the whooping begins) and be kept up for two weeks and sometimes three.

4. It is doubtful if it is necessary to continue the quarantine until the whooping stops—at least the latest literature is to the effect that quarantines can be terminated before the whooping stops.

In measles there are cases that never break out, and in whooping cough there are cases that never whoop. However, these cases are just as "catching" as any.

Quit listening for the whoop. It is just a detail. It kills no child. Medicines to stop it do not succeed and would do no good if they did. Attention should be concentrated on saving the child from secondary pneumonia or other secondary effects.

Whooping Cough Contagious.—*Mrs. E. L. J. wishes to be enlightened concerning contagion of whooping cough.*

REPLY.—Whooping cough is extremely contagious during certain stages. It is moderately contagious when the cough starts and up to the time when the whooping starts. It is highly contagious during the whooping stage. It is moderately contagious for about one week after whooping stops. Occasionally there is danger of contagion for a few weeks after whooping has stopped, say four weeks. These delayed infections are difficult to provide against. It is not reasonable to confine the sick person until all danger of delayed infection is past. Especially is this true in scarlet fever and whooping cough. The quarantine should be continued so long as contagion can be reasonably expected.

Authorities are pretty well agreed that persons who have been in close contact with a case of whooping cough can transport the contagion. A whooping child spreads secretion rather more actively than a child with any other form of contagion. Nevertheless, remember that the sick child as a spreader is first in importance. Those in close contact form a bad second.

Whooping cough does not persist three months. A child with a cough persisting three months after a whooping cough started has had, say, six weeks of whooping cough and six weeks of some other infection. The child is not capable of spreading whooping cough then. But the family doctor should determine why the cough persists.

Incubation Period.—*Mrs. I. B. H. writes: "Will you please tell me: (1) Is it possible for a child to get whooping cough in four or five days after being exposed? Also, do you think it possible for a child to get the disease by playing in the open air? (2) When a child just across the street has it also, if the child with whooping cough is playing in his yard? (3) Do they cough up a thick yellow mucus? (4) How long is the disease considered contagious?"*

REPLY.—(1) The usual time is a week to ten days. Four to five is too short a time. (2) If the child stays on his side of the street there is no danger, provided the people and the things in contact with the child also stay on their side of the street. (3) Yes. (4) For about a week or ten days. The contagion is pretty well over when the whooping starts.

Whooping Cough Danger.—*J. R. K. writes: "Is there no way of preventing heartless people from traveling with children—of their own—who are suffering from whooping cough? When I boarded a Père Marquette railroad train at Holland, Mich., last month a minister of the gospel, wife, and two small boys also got on the train and occupied four seats in a parlor car. The younger of the two boys, 4 or 5 years old, had as severe a case of whooping cough as I have ever seen or heard. The older child had had it, was still coughing, but not whooping. There were no less than six other children passengers in that car. One young woman, about 20, had never had the disease, and when the mother suggested that they find seats in another car, the mother of the whooping child laughed aloud as though it was a huge joke.*

"The colored porter told me that he had never had it and that he had two babies at home who would be exposed, should he contract the cough. It seems to me that such criminal selfishness and thoughtlessness are absolutely inexcusable in anyone, but especially so in one calling himself an apostle of all that is highest in life."

REPLY.—The laws prohibit people with contagion from traveling. The case is covered by the municipal ordinances of most of the towns through which the road runs; also by the state laws of the three states traversed and by the national laws. Furthermore, the conductor of a train has a certain amount of police power over persons on his train.

I suggest that you report the facts, including the name of the parents, to the Health Department of Chicago.

Should you have a similar experience appeal to the conductor at once. Whooping cough ceases to be contagious before the whoop ceases. You may be safe.

Shouldn't Go to School Yet.—*J. C. K. writes: "My little boy has had whooping cough for several weeks. There will be days when he does not cough at all, but a cold, or dampness in the weather, seems to affect him, and he will cough almost as hard as ever, throwing up his food and spitting up white mucus. He will whoop at such times also. Now, please tell me how long shall he be kept out of school. Until the cough stops, or has he passed the time when he can give it to others?"*

REPLY.—The regulations of the Health Department provide that he must stay out until he quits whooping. As he vomits when he coughs, clearly he should not go to school. Most authorities say the danger of contagion has ended at eight weeks.

Whooping Cough and Quarantine.—*S. A. E. writes: "1. Is whooping cough a quarantine disease in Illinois, and is there a penalty for not placing such cases in quarantine? 2. Should such cases be allowed on the street and in school in any case? 3. How long is the disease contagious? What are its dangerous aspects?"*

REPLY.—1. It is. The state board leaves the details to local health departments. If the local department fails to control a situation the state board will step in to assist or to take charge if circumstances warrant.

2. Children with whooping cough should not be allowed on the streets or in school when the disease is starting before the whoop begins. After the whoop stage has developed the contagiousness of the disease rapidly decreases. The practice of health departments with respect to this stage varies. Some demand from one to two weeks' quarantine in the house after the onset of the whoop stage. Some departments tag the whooping children and then permit them on the streets.

3. The chief danger is from pneumonia. The death rate from this disease is high in children under 2 years of age.

Duration of Whooping Cough.—*A. J. L. writes: "1. Kindly advise me what to use to cure or check the whoop of a child 5 years old with whooping cough. 2. Can one catch whooping cough more than once? 3. How long does it usually last?"*

REPLY.—1. Nothing is of much service.

2. Yes, it is possible, though very improbable.

3. The contagion is greatest before the whooping begins. The evidence is that there is not much danger of contagion after the case has run three weeks.

Whooping Cough Treatment.—*M. K. writes: "Will you kindly let me know if there is any way to prevent a child from getting whooping cough, and also what will help one that has it already?"*

REPLY.—If a child is kept away from whooping cough in its early stages he will not have the disease. A child having whooping cough should be kept away from other children, should have plenty of fresh air, should be kept clean, and should be otherwise kept in good condition. Many remedies for the cure of whooping cough have been proposed; none has been proved.

City Will Fumigate.—*L. writes: "A family with two children, who have whooping cough, moved from the apartment adjoining ours a week or ten days ago. The apartment is to be occupied next week, and it has not been fumigated. Ought this to be done? Will the City of Chicago do it?"*

REPLY.—Yes and then cleaned and aired. The city will do it.

MUMPS

Health departments do not regard mumps as of much importance. Mothers are not so certain about that. Superintendents of children's homes, asylums, and hospitals and principals of boarding schools and academies know that the disease at intervals is a source of great worry.

Early in the year 1911 an epidemic of mumps developed in the New York Hebrew Infant Asylum. Dr. Hess thought perhaps a method of protection which had been used to cure certain diseases and to prevent others might be made use of; at least it was worthy of trial.

The method consists in the injection of one or two teaspoonfuls of blood from a person recently recovered from mumps into a person who has been recently exposed to the disease.

Mumps is a highly contagious disease. It has a long incubation period. About eighteen days elapse between exposure and the onset of the disease. Therefore, when any person who has never had mumps is exposed the chances are that he will have the disease, but that it will not show itself for eighteen days. If the injection can be given, therefore, within a short time after the exposure, there is ample time for it to get in its work as a protector.

At the time the test was made there were 153 children in the home. Of these 135 were susceptible to mumps. 20 of the susceptibles were injected. None of the 20 susceptibles developed mumps, although all were exposed to it. Of the noninjected children 44 got the disease.

This test shows that under the conditions which prevail in children's homes, mumps, once it gets a foothold, may be expected to attack about half the children who have not already had it. But by this injection method the disease can be stopped at once.

The method consists of injecting about one-half to two teaspoonfuls (6 to 8 c. c.) of blood under the skin of the child to be protected. The blood is drawn from one child and immediately injected into the other. It can be drawn from a child in whom the mumps swelling has not completely subsided without harming either the sick or the well child. Perhaps it is

better to draw it from children who have been convalescent for ten days or two weeks.

Perhaps the blood of children who have had mumps two years before is protective. On that point Dr. Hess was not certain, nor could he say how long the protection lasted.

I am sure that this method of protection will not be of interest to the average mother. It will be of great interest to those in charge of children's institutions. Perhaps some physicians will use it to protect other children of a family in which a case of mumps has developed.

Dr. Hess suggests that the same method be employed against measles. Health departments regard measles as of much importance.

CHICKEN POX

Chicken pox is essentially a disease of child life, although no age is exempt. It affects babies at the breast and is rarely met with after the tenth year. Grown-ups are seldom attacked even when they have escaped the disease in childhood.

Chicken pox is the mildest and least important of the eruptive fevers, usually with no complications, although the kidneys are sometimes affected and sometimes erysipelas appears.

The disease may occur in one family only but is usually epidemic, spreading rapidly through families, schools, and institutions. The fact that it spreads so rapidly shows the contagion is readily diffused through the air to all parts of the room and that personal contact of the well with the sick usually means transmission of the contagion.

That the contagion is short lived is shown by the fact that the disease is not readily transmitted from home to home and from school to school.

The period of incubation is generally fourteen to sixteen days.

Chicken pox begins with a marked rise in temperature, headache, nausea and, in some instances, chilly sensations. The temperature may rise to 103, or in severe cases even to 105. There is generally loss of appetite.

The rash, which is the characteristic symptom of the disease, appears about the same time that the fever does. In some cases it may even precede the appearance of the fever. It usually appears on the head, face, and trunk. The rash looks like small water blisters with red areas about them.

It is important that the child should not scratch, as scars may result. Washes to allay the itching should be used. The child's hands should be kept clean, and the nails trimmed short, or, better still, white muslin mittens should be worn.

In the treatment of the disease care should be exercised to control carriers. To accomplish this those who come in contact with the disease should always wash the hands thoroughly after coming in contact with the infection.

Carriers are not of much more importance than such conveyers as spoons and towels. Sunlight, air, and drying will help much to destroy the infection; hence the importance of keeping the room in which the patient is being nursed in hygienic condition.

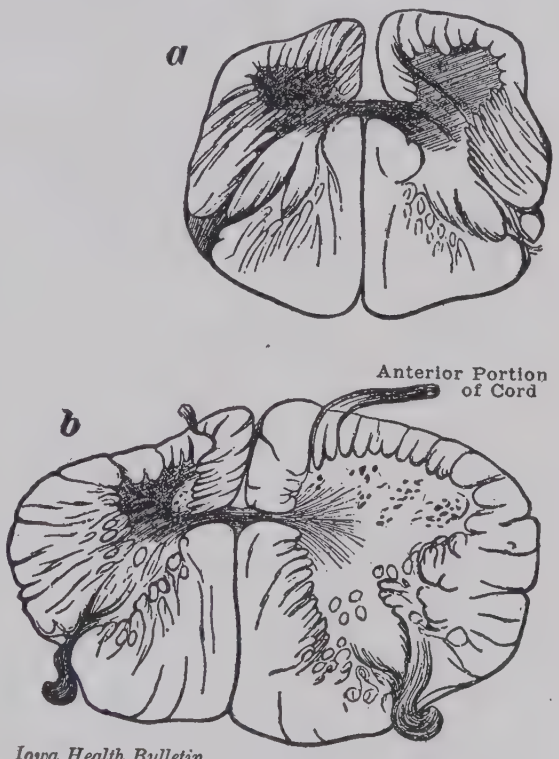
The medical treatment consists in controlling the symptoms with such simple remedies as are necessary to keep down the fever and prevent constipation. Children should be kept in the house until the rash begins to dry and form scabs. They should not be allowed to go to school or be with other children until the skin is perfectly clear.

INFANTILE PARALYSIS

The statement made by Dr. Rosenau at the Congress on Hygiene, that he had succeeded in infecting monkeys with infantile paralysis by means of flies, increases our interest in this insect.

The virus of infantile paralysis is exceptionally resistant. In the sick person it is found in the brain substance, the nose secretion, in the mesenteric glands — the lymph glands near the intestines — and sometimes in the blood.

Its presence in the mesenteric glands is explained as follows: It is secreted by the membrane of the nose and mouth and becomes a part of the saliva. It is swallowed into the stomach whence it passes into the intestines. The digestive juices of the stomach and intestines have no power to destroy the virus—therefore it passes through their walls and can be recovered from the mesenteric glands.



Iowa Health Bulletin.

FIG. 107.—ATROPHY OF THE SPINAL CORD AFTER INFANTILE PARALYSIS. Zones a and b show shrinking of the horns and general lessening in size of affected half of the cord.

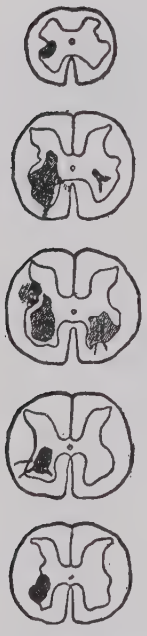
When these glands are macerated the virus prepared from them will cause the disease when injected into well monkeys. This proves that the virus is exceptionally resistant, for, it will be remembered, snake poison and many other poisons are made harmless by the stomach and intestinal juices.

The virus of infantile paralysis passes through the smallest pored filter used. It stands heat, drying, sunlight, and chemical disinfectants much better than does the ordinary disease-causing organism. When a child has had

the disease, the nose secretions remain capable of causing the disease for weeks and sometimes as long as for six months.

The fly which Dr. Rosenau found capable of spreading the disease is the stable fly. This fly breeds in stable manure and lives in it and around animals. It will not eat ordinary food under ordinary circumstances. Rosenau noted that he had been unable to get them to eat anything but blood or to drink any water. Nuttall of England said he had succeeded in getting them to eat grape juice.

The practical significance of this observation is that it will prove difficult to poison or to catch this fly. Fly paper and fly poisons do not appeal to its palate and it may prove suspicious of fly traps. Rosenau suggested that this fly might get, and probably did get, its dose of virus by sucking the blood of the sick and that the infection by it of the well may be by biting or by regurgitation on human food.



owa Health Bulletin.

FIG. 108.—DIAGRAMS SHOWING AREAS IN CORD MOST AFFECTED BY INFANTILE PARALYSIS.

That the fly does not serve as a simple mechanical carrier of germs, as flies do for typhoid and consumption, was proved by the interval of time between cases. From the time the sick monkey was bitten by a fly until the bitten monkeys got sick was three weeks. The virus during some of that three weeks was living, changing, developing, in the fly. When the right time comes the fly belches up the virus as a cow belches up her cud. This habit of belching up the contents of the stomach belongs to flies as much as it does to cows.

There is greater danger that a milk wagon driver will spread infantile paralysis than that one will spread scarlet fever when a child has that disease, since scarlet fever is seldom spread by well people and infantile paralysis frequently is.

If one hundred people are brought in contact with infantile paralysis fifty of them will go to bed sick with the disease. The other fifty will keep well themselves, but they will spread the contagion right and left through their nose and mouth secretions. The contagion having got into the nose secretions, it remains there for two to four months.

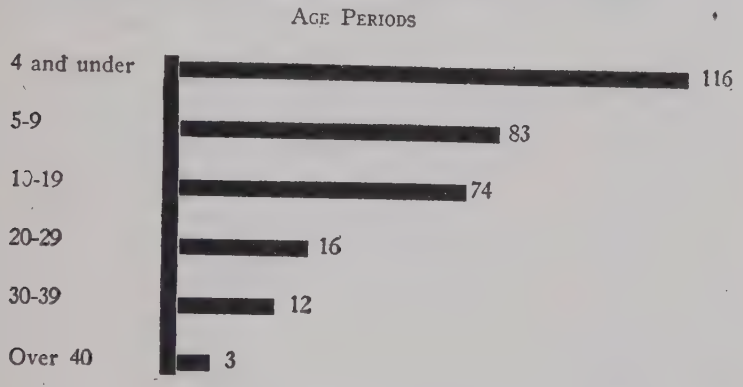
Infantile paralysis is usually a disease of small cities, towns, and country neighborhoods. It does not often cause much trouble in the large cities.

So much as a basis for suggestions as to what must be done to prevent its spread. First, it must be made a quarantinable disease. The quarantine must be enforced. Nobody in contact with the sick person should be allowed out of the quarantine. Nobody in contact with the sick person should be allowed to sell, distribute, or handle milk or any other food. Children from the affected homes should not be allowed to attend school. The convalescents and the contacts must be quarantined for four months after the disease or the exposure. After death or after convalescence has terminated in a case the house should be disinfected, but no one should lose sight of the fact that contacts and not infected houses are the chief sources of contagion.

Flies should be killed, especially around stables.

A state board of health fearing an epidemic should send a communication to every physician and newspaper asking that cases of infantile paralysis be reported at once. Upon the receipt of the report of a case an officer of the state, except when the local health department is active, alert, and well informed, should go at once to the locality and institute proper measures of control. School principals should see to it that no convalescents and no contacts, no children from infected homes, come to school until it is safe for them to do so.

It is always easy to end a local epidemic promptly, but the measures of control must be efficient and compelling. A white-livered quarantine leaves the community afraid and uneasy for months. A school principal who is firm can make his school safe. A state administration can protect the people of its state. All down the line the question is: Will they?



Vermont Bulletin.

Fig. 109.—Age Distribution of Cases of Infantile Paralysis.

The Chicago Department of Health has issued a valuable leaflet containing "information in case of infantile paralysis." As safeguards against spreading the disease it suggests:

"The windows and doors of the room in which the patient stays should be screened against flies and other insects.

"Allow none but the necessary attendants in the patient's room.

"Allow no visitors in the house.

"Other children in the family must stay at home; must not go to public places such as school, church, parks, or theaters. Isolation must be maintained for four weeks.

"Flowers brought to the sick should not be thrown out, but placed in disinfecting fluid or burned.

"The nose and mouth of the nurse or others who are compelled to come in contact with the patient should be thoroughly washed out before leaving the sickroom, using freely a 2 per cent. solution of peroxid of hydrogen or 1 per cent. menthol in oil.

"Disinfect all dishes, utensils, bedding, towels, napkins, clothes, handkerchiefs, clothing, books, papers, and remnants of food before removing them from the room. Sweep and clean room with a cloth wet in a disinfecting solution. Do not use a broom unless frequently dipped in a disin-

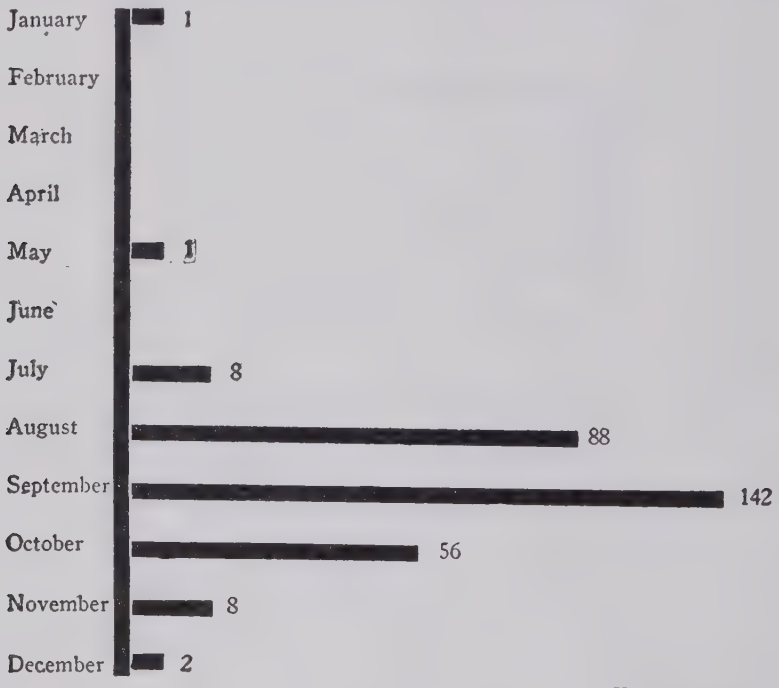
fecting solution, and use while wet. Avoid dust in the sickroom. It is believed that dusty rooms, dusty houses, dusty streets are important factors in spreading this disease."

INFANTILE PARALYSIS EXERCISES

For the treatment of infantile paralysis by exercise of the upper extremities, upper arm and shoulder muscles, Dr. Wright recommends the following:

"Shoulder region:

1. The patient lies on his back with the arm at the side and shrugs the shoulders, bringing them as nearly up to the ears as possible.



Vermont Bulletin.

FIG 110.—SEASONAL DISTRIBUTION OF INFANTILE PARALYSIS.

a. With the assistance of the physician, who grasps the patient's arm above the elbow and uses it as a lever to raise the shoulder while the patient aids the movement by trying to contract the muscles.

b. Without outside help.

c. With resistance from the physician, who pushes down on the point of the shoulder with one hand.

2. The patient sits erect with the arm hanging at the side and raises the shoulder as high as possible.

a. With the resistance of gravity alone.

b. With the added resistance of the physician's hand pressing down on the point of the shoulder.

Upper arm:

1. The patient lies on his back with the arm at the side and moves it sideways upward along the table until it stretches above his head.
   a. With assistance under the elbows.
   b. Without outside help.
   c. With resistance above the elbows.
2. The patient sits erect with the arm at the side and raises it straight sideways until it is stretched vertically above his head.
   a. With the resistance of the weight of the arm.
   b. With the added resistance of the physician's hand pushing down just above the elbow.

Forearm:

1. The patient sits with the inner side of the whole arm resting on the table and bends the elbow by sliding the forearm along the surface of the table.
   a. With assistance on the back of the wrist.
   b. By unaided contraction of the muscles.
   c. With resistance on the front of the wrist.
2. The patient sits with the elbow resting on a cushion and raises the forearm until the hand touches the shoulder.
   a. With the resistance of gravity alone.
   b. With added resistance on the front of the wrist.

Other positions than those above referred to can be worked out for the special parts and the muscles exercised after the same general plan. The main thing, when practicing the exercises, is to see to it that the patient does not cheat himself and that he does the actual work. The exercises should be gone through with at least once each day."

CAUSES OF PHYSICAL DISABILITY OF 721 CRIPPLED CHILDREN, BIRMINGHAM, ENGLAND, 1911

Cause	*Cripples*	
	Number	*Per Cent.*
Tubercular disease	285	39.5
Infantile paralysis	175	24.3
Rickets	73	10.1
Congenital deformity	71	9.8
Apoplexy	33	4.6
Birth palsy	25	3.5
Accident	25	3.5
Scoliosis	13	1.8
Scattering	21	2.9
Total	721	100.

WHAT THE MOTHER OF A CRIPPLED CHILD OUGHT TO KNOW

Dr. Orr of Nebraska estimates that there are 250,000 crippled children in the United States. Reeves in his "Care of Crippled Children" quotes a

Birmingham (Eng.) estimate that 25 per cent. of the crippled children are crippled as a result of infantile paralysis. As a matter of fact, the percentage varies from year to year and in different portions of the country.

If the estimates are correct (and infantile paralysis has been unusually active during the last fifteen years), the number of children in the country crippled as the result of this disease is 62,000.

It is important that mothers should know that infantile paralysis starts with a fever, and that no signs of paralysis show in the early stages of the disease. It oftens happens that mothers do not suspect infantile paralysis to be the cause of their children's mild symptoms, even when infantile paralysis is in the neighborhood, until the muscles begin to shrink.

It is more important that the mother know that the great wasting of the muscles after infantile paralysis is not necessary. The disease is located in the spinal cord and not in the muscles. The muscles waste after the disease, not during it. By beginning passive motion, manipulation, and electricity just as soon as the fever goes down and while the child is still sick and by keeping it up steadily wasting of the muscles can be prevented. Good medical care in the height of the disease is of some service. Good care as the disease subsides is of very great service.

To my mind it is important that the mothers know that, after the limbs have wasted, they cannot be restored. The best that can happen is that by braces in most cases and by operation in others some control of the limbs is possible. For this service there are good hospitals, dispensaries and schools. A list of these is to be found in Reeves' "Care of Crippled Children."

The reason for putting stress upon this phase of the subject is that I hear from so many mothers who, grasping at straws, carry their children long distances and spend much of their money because of letters of solicitation in which wild promises of impossible cures are made.

It is important that the mothers of children crippled by infantile paralysis know the importance to their children of play in the open air.

The figures from Birmingham show that 10 per cent. of the cripples are such by reason of rickets. The percentage seems higher than in the United States, unless we count the cases of bowlegs and knock-knees and very thin chests as crippled from rickets.

It is important that a mother know that mild degrees of deformity from rickets will pass away under good food and good hygiene. A thin chest can be flattened out by exercises begun early and persisted in. Bob Fitzsimmons is an illustration of what a knock-kneed, "wabbly-legged," probably rickety person can develop into. None other of the cripples responds so well to good food and good hygiene. Some of the worst cases can be straightened out by operation.

Whether or not a crippled child is to suffer from neglect rests very largely with the mother.

Infantile Paralysis.—*A. L. writes: "What is the cause of meningitis in a child one year old? A child was nursed by its mother, who was in good health. This child was apparently well until about eight months old. It lived until fifteen months, but did not do well after eight months, always refusing food of all kinds."*

REPLY.—This child probably had meningitis or infantile paralysis. These diseases are due to germs. The germs are different from each other, but they spread in the same way and cause diseases that are a good deal alike.

Infantile paralysis is the more probable in the case of a baby eight months old. This disease has been spread rather widely in this country during the last five or six years. There has been a good deal of it in Eau Claire, Wisconsin, Mason City, Iowa, and in certain parts of the East. Fortunately in Chicago there has not been much. It is contagious. The germ gets into the nose. Usually it does not do any harm, but occasionally it gets through the nose and into the nervous system.

The preventive measures to take are: First, to keep away from all children having the disease or having been in contact with those having had the disease; to see that all children that have been in contact with it have their noses carefully looked after and kept very clean.

It is wise to be on your guard against very mild cases just as much as against severe ones.

Infantile Paralysis Infectious.—*C. W. writes: "Is infantile paralysis either contagious or infectious? How long after commencement of the disease is it until it is safe to let other children associate with the patient?"*

REPLY.—1. It is.

2. Usually the nose secretions are infectious for several months.

Clothing and Infantile Paralysis.—*A. B. writes: "Is there danger of contagion if one child should wear clothing of another who has had infantile paralysis?"*

REPLY.—If the clothing has been properly fumigated, cleaned, sunned, and aired, it is permissible; otherwise, not. Investigation of flies as carriers of infantile paralysis has not gone far enough to warrant anyone in abandoning fumigation and cleaning as means of control.

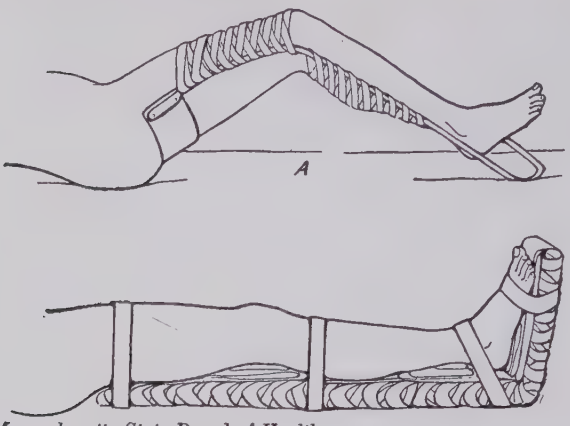
Spread of Infantile Paralysis.—*J. H. writes: "Can you offer any explanation of the increase of what is known as infantile paralysis? Is it possible that the prevalence of the disease is in any measure due to the now common use of the low, springless vehicles, known as go-carts, some of them collapsible, which have almost superseded the high cabs in which the little ones used to be taken on their outings? It always has seemed to me that the so-called go-carts, because the occupants ride so near the ground, inhaling, as they must do, the dirt and dust, and because this class of vehicle is rarely fitted with springs and must shake up the babies mercilessly, could not be otherwise than bad for the young child. Am I right?"*

REPLY.—Infantile paralysis is a germ disease. It has been quite prevalent for several years.

The main factor in its spread is the nose secretion of those who have had it and who have been in contact with it. Few of those who have had their noses infected with the organism get the disease. They go about feeling well but capable of spreading it. They are known as carriers. It has been held that their nose secretions get into the dust, and in that way dust causes it. Thorough street sprinkling is one of the methods used to stop epidemics of the disease.

Nevertheless, I do not think your suggestions are very good. Shaking from lack of springs on the buggy can have no effect. There is practically no difference between the amount of dust two feet above the ground and

four feet above, particularly where the vehicle in question raises as little dust as a baby carriage.



Massachusetts State Board of Health.

FIG. 111.—BRACES TO PREVENT DEFORMITY AFTER INFANTILE PARALYSIS.

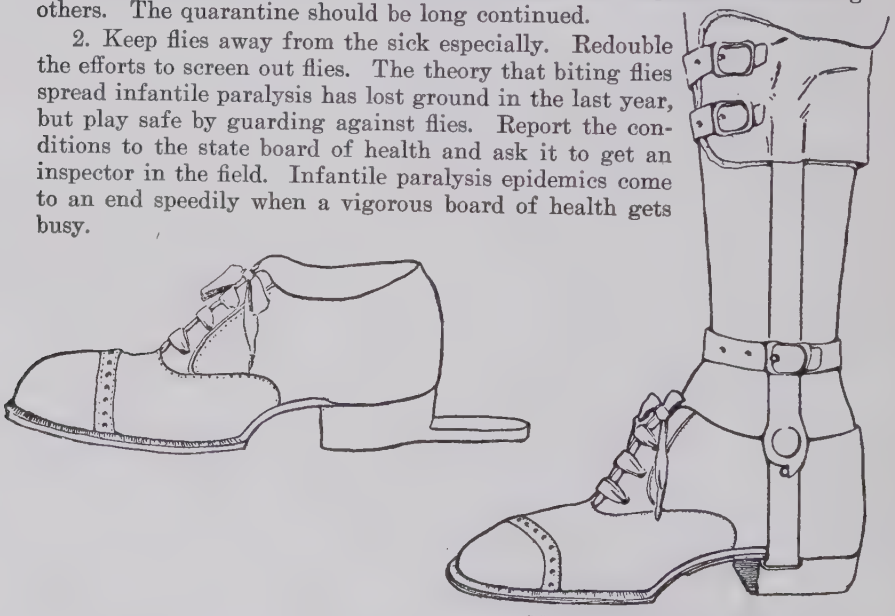
The cause of the increasing frequency of infantile paralysis is an increasing number of carriers. By the way, infantile paralysis—so called—affects people of all ages.

The statements relative to infection of the nose and carriers apply with equal truth to cerebrospinal meningitis.

Care of Infantile Paralysis.—*A. A. L. writes: "There are two cases of infantile paralysis in our town. Should such cases be quarantined? Are there any other measures that can be followed by the public to prevent an epidemic?"*

REPLY.—1. Yes. The quarantine should include not only the patients but all well persons in contact with the sick ones. The difficulty in handling epidemic infantile paralysis is due to the large percentage of persons who become carriers—that is, well themselves, but capable of infecting others. The quarantine should be long continued.

2. Keep flies away from the sick especially. Redouble the efforts to screen out flies. The theory that biting flies spread infantile paralysis has lost ground in the last year, but play safe by guarding against flies. Report the conditions to the state board of health and ask it to get an inspector in the field. Infantile paralysis epidemics come to an end speedily when a vigorous board of health gets busy.



Massachusetts State Board of Health.

FIG. 112.—SHOES TO PREVENT DEFORMITY AFTER INFANTILE PARALYSIS.

CEREBROSPINAL MENINGITIS

HOW CEREBROSPINAL MENINGITIS IS SPREAD

Cerebrospinal meningitis and infantile paralysis are a good deal alike from the clinical standpoint. Meningitis affects the covering of the spinal cord. Infantile paralysis affects certain nerve cells in the cord itself; that is, the main effects of the germ are spent on these structures. At the same time the poisons of each germ in some measure poison all the cells of the cord in each instance. That is the reason so many symptoms of infantile paralysis are also found in meningitis.

From the epidemiologic standpoint also they behave a good deal alike. Nevertheless, they are separate diseases having different germs.

Cerebrospinal meningitis is usually due to a coccus much like the pneumonia coccus in its shape, size, and general behavior. Inflammation of the coverings of the brain and cord not infrequently results from the pneumococcus. In some epidemics of meningitis they find the pneumococcus to be the cause. In most of them the meningococcus is responsible.

The disease is spread by the nose secretions. Sneezing, coughing, speaking, even breathing, throws the secretion into the air from which it speedily settles on everything around. From the nose the bacteria get into the mouth and thence are spread by the mouth secretions. The germs get into the body through the nose, where they lie.

It is but a short distance, much less than an inch, to the covering of the brain. If the germs make this journey they cause meningitis; otherwise not.

Most people who take in meningitis germs do not have meningitis. Some do not get sick at all; some call their illness a cold; some, rheumatism; some, sore throat; some, malaria.

There is little in the sickness to make anyone—patient, family, friends, or doctor—think the case one of meningitis.

Other cases have some nerve symptoms but they are not prominent. A quick witted, alert physician might be able to diagnose meningitis in these cases but if he does he is called an alarmist.

The proportion of atypical cases of meningitis to typical cases is about five to one. The large number of atypical infections is responsible for the general uncertainty as to what to do in an epidemic.

A case will be treated in a hospital ward and no one catches it; the nurses, internes, doctors, and other patients escape. One is sick in a family of children; it does not spread to the other members of the family.

The explanation is that the others have had the infection but it has caused no disease or it has caused some minor sickness that was overlooked.

Persons spread meningitis; things do not.

EPIDEMIC MENINGITIS

About every so often a case of epidemic meningitis occurs in every community and at long intervals it breaks out into a regular epidemic. Meningitis does not behave just as measles does. It will jump about in a

town skipping whole blocks. As a matter of geography it is hard to understand. If a health officer takes a map and on it spots the cases in a scarlet fever epidemic it is easy to show the effects of contacts. Meningitis skips from one place to another so that a spot map shows nothing of foci infection.

The reason is that meningitis is a good deal like pneumonia in some particulars. In each of these diseases the germs get into the nose and throat. In each of them the average person who gets the germ does not get the disease; in each of them well persons carrying the germs can communicate it to others; in each of them recovery from the disease does not mean that the germ disappears from the throat and nose. All of which means that it is much more difficult to isolate cases of meningitis than cases of smallpox or scarlet fever.

The epidemiologic rule is that in times of epidemic all people should take especial pains to keep the nose and throat clean. All cases should be well isolated not only during the attack but subsequently until the coccus disappears from the nose secretion.

Why the coccus in one instance stays on the surface and in another gets through and into the blood or into the membranes which cover the brain we have no idea.

We have a few observations as to why the pneumonia coccus in one man stays on the membrane and in another gets into the blood and is carried to the lungs; but we do not know enough about it to be of any practical service. With meningitis we are still poorer in exact knowledge.

There is a practical point that grows out of the little we know and that is that when a person has meningitis or pneumonia or has recovered from either, the nose and throat secretions for years thereafter should be burned or boiled—otherwise the carrier may harm his family or friends.

CEREBROSPINAL FEVER

In the popular mind this disease and infantile paralysis are commonly confused. For this confusion two facts are responsible. The two diseases affect the central nervous system and both are spread by carriers and aborted cases rather than by the out and out sick.

In cerebrospinal fever there is fever, vomiting, unconsciousness, stiffness of the neck, bowing of the back, and sometimes an eruption. In infantile paralysis wasting of the muscles is liable to follow the acute disease. In cerebrospinal fever an eye is liable to shrivel up or some other special sense organ will lose its power to work.

Generally an epidemic begins in the autumn with some case that has been infected in some unknown and undiscoverable way. Soon there are other cases and still others until the community is peppered with them. No connection between these cases can be discovered.

When health officers begin active work to control the disease they commonly examine the nose secretions of every person who has been in contact with the cases. They examine the nose secretions of every school child. If the community is very much alarmed the officers may examine every nose in town.

The disease is due to an easily discovered coccus. This coccus secures

entrance to the nose. It multiplies in the nose secretions. Sometimes some of these cocci travel from the nose to the covering of the brain. The distance is less than an inch and the paths are not difficult to travel.

The persons in whom this happens have the disease. As they quickly become violently sick and as the coccus dies quickly on towels, sheets, and other articles the sick persons do not spread the disease to any extent.

If the coccus does not spread to the brain the infected person walks around infecting others. He may think that he has a cold. He may be entirely well so far as he can notice.

Rosenau says that 70 per cent. of the exposed have meningococci in their noses. Thayer found in the Texas epidemic that 60 per cent. of the persons with cocci in their noses were well people and most of the other 40 per cent. were but slightly sick.

Flügge found that ten cases were caused by healthy carriers for every one that was caused by a case of cerebrospinal fever. Cases of fever have cocci in their noses for the first fourteen days of the disease. Park could not find them there after the sixteenth day.

When the disease appears in a community the cases should be promptly reported to the health department. The department should isolate and quarantine them. It should make a systematic examination of the nose secretions of the people, starting with the families of the sick, then taking the physicians, then the school children and finally examining the community generally.

The carriers should be kept under observation. The people generally should be advised to keep their noses and throats clean.

ERYSIPELAS

The pain of erysipelas is described as burning. The infected areas of the skin are fiery red. Quite naturally the disease was thought by the ancients to be a form of fire. Involving the skin, plainly in view, easy to see, and burning like fire, it was one of the first diseases to be noted. Beginning with Hippocrates every medical writer of antiquity knew erysipelas. Reference to it is found in Arabian, Egyptian, Greek and Roman literature. It was doomed to be named for some saint and the doubtful honor fell to St. Anthony.

As the disease had so many of the earmarks of a visitation of anger, it followed that in the days when the gods and men were supposed to be constantly mixing in one another's affairs erysipelas was held to be a visitation of the wrath of the gods.

When this era of thought gave way to that of even more vague speculation nearly every condition of climate, race, sky, earth, and environment in every sense was at one time or another accused of being the cause of erysipelas. At last with the development of the germ theory of disease there came the discovery in 1883 that the cause of erysipelas was a coccus.

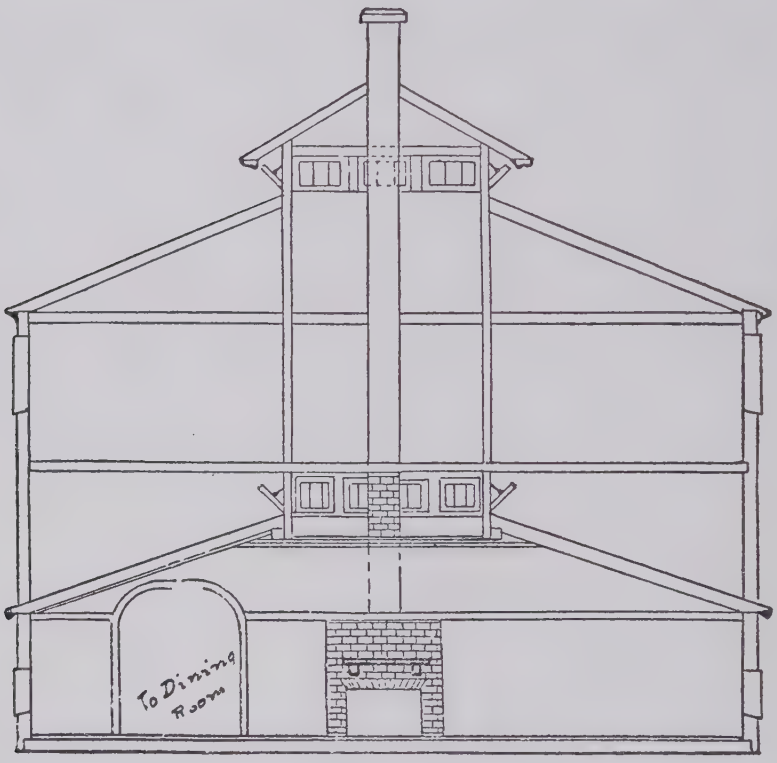
When Justinian began his work in the Roman forum no library was large enough to hold the Roman law. When he left it the libraries were useless, for Roman law was a matter of a single book. When Fehleisen's discovery had been established it was in order to burn the shelves of books containing the speculations about erysipelas. What makes the difference worth

while is the difference between the disease now and prior to 1883. Fifty years ago erysipelas was one of the scourges. Now it is a disease of no special importance.

In Hirsch's "Handbook" there is a record of sixty-seven severe epidemics of erysipelas in the United States between 1822 and 1880.

In 1854 Oliver Wendell Holmes wrote:

"We suppose smallpox or cholera would not cause greater consternation



(Cross Section through Living Room.)

FIG. 113.—MASSACHUSETTS HOSPITAL SCHOOL FOR CRIPPLED CHILDREN. Cross section of two-story monitor roof cottage, showing false roof and ceiling ventilation transoms in both stories, which prevent drafts and defy storms. (Reeves' "Care and Education of Cripple Children.")

in many neighborhoods than the appearance of that violent type of erysipelas known from a prominent sign as black tongue, but even when unaccompanied by this feature the disease is much dreaded in the western states. From what we have seen and read and heard of it no part of the earth has suffered more from epidemic erysipelas than Illinois, Indiana, Missouri, and parts of Tennessee and Iowa. It has raged with great violence on the plains on the route to California, has been very common and of grave type in Santa Fé, and in California it is a frequent and much dreaded disease."

Hirsch says: "Just as it has been met at all periods in the history of mankind, erysipelas occurs in all parts of the world." To which should be added, in all races and in every environment.

Even when speculation as to its cause was most vague, when every circumstance of soil and climate was being accused of being the cause of erysipelas, there was one observation on which everybody was agreed that should have led the way out of the wilderness. It was that hospitals were great foci for the disease.

It was observed that "the headquarters of the disease have always been found in self-contained places occupied by a considerable number of persons, most of all in hospitals, and next to them in lying-in hospitals, foundlings' hospitals, lunatic asylums, educational institutions, and the like."

Certain wards in the Hotel Dieu (general hospital) in Paris were notorious as wards from which erysipelas radiated, as well as St. Bartholomew's at London, Frederick's Hospital at Copenhagen, the University clinic at Marburg and Bellevue at New York. In that day if a hospital was known at all it was known as an erysipelas center.

In the Lyons hospital prior to 1867 "the severest operations had been performed without erysipelas occurring, but from that date onward the larger number of cases operated on were attacked with erysipelas."

Conditions were so bad that the medical wards fought shy of the surgical wards lest the infection spread to them and maternity hospitals had to keep as far away as possible.

In the Civil War it was found that the wounded cared for in tents and improvised hospitals got on better than those housed in the best hospitals in the country. The authorities sought the explanation in overcrowding and in lack of cleanliness.

In the Middlesex Hospital it was noticed that nearly every case placed in either of two beds in a ground floor ward developed erysipelas. It was found that these two beds were placed one on each side of a window which opened out on the "common dusthole of the hospital, so that the effluvia from it entered the window and traveled directly to them."

I remember when a professor in Bellevue reported that there was no way to disinfect certain erysipelas wards in that hospital, that the infection was in the walls, and that the only remedy was to tear down the building.

However, then it began to be observed that there was some erysipelas in clean hospitals. Pujos, reporting upon St. André's at Bordeaux, a model institution, said that even the cleanest and best constructed wards did not escape erysipelas entirely. Volkmann reported that hospitals salubrious to the point of luxury had epidemics of erysipelas.

It was plain that while dirt had to do with erysipelas it was a secondary and not a main factor. In that day everything around the hospital was charged with responsibility for spreading the disease. The essential was overlooked—the people themselves.

Soon after Fehleisen's discovery was accepted attention began to center on people. Now we know that erysipelas is spread by people, not by things. Acting on this information, a line of precedure is followed which has ended the terrors of the disease. The statements of Oliver Wendell Holmes sixty years ago have a Munchausen flavor to the man who cannot remember beyond 1880.

At the present time there are no erysipelas wards in the old sense.

Contagious disease hospitals have erysipelas wards to which are carried cases of erysipelas for safekeeping in order that the community may be spared. In these wards the attendants are careful to sterilize their clothes and their hands. The ward is kept clean and the ventilation is good. In consequence the ward never infects other wards or the neighborhood of the hospital.

The surgical wards never develop erysipelas. A case of erysipelas in a maternity ward would cause a trial of the attendants by the proper authorities. No longer do the medical wards of a hospital shun the surgical and obstetrical wards. The case is reversed. The attendants in the surgical and maternity wards are always on guard to prevent erysipelas or any other form of sepsis from overflowing from the medical wards to them. To surgeons and obstetricians erysipelas is no longer a bogy.

The medical man has not mastered the situation so well. Epidemics are few and individual cases are rare. The expectation is that a person having erysipelas will get well. In 1909 there were but 130 deaths from erysipelas among Chicago's more than 2,000,000 people.

The disease has lost practically all of its terror. Nevertheless it cannot be said that the medical man has met his problem as well as the surgeon and the obstetrician have met theirs.

Erysipelas is due to a chain coccus called the streptococcus of erysipelas. This coccus gets through the skin through a wound. A wound barely large enough to be seen is amply large enough to allow the entrance of the coccus. The most frequent site of the entrance is the edge of the nostril and the most frequent wound is a small chap-fissure. The rule is that the fissure does not attract attention until it begins to burn from the erysipelas infection.

The chance that one will become infected is low in summer. In September the number of cases begins to increase. As the cold weather comes on and people are herded closely together, the chance of erysipelas increases. The increase mounts markedly in February and continues through March and April. In April the maximum is reached, and the spring and summer decline begins.

If a person has had the disease once his liability to it is somewhat increased.

The cocci, having found entrance through the wound, locate in the lymph spaces immediately below the skin. They spread rapidly in these lymph spaces. A patch on the nose the size of a dime can spread to involve the entire head within a day.

Generally speaking, the spread is slower. It is easy to note the rate of spread as the irregularly raised red line travels across the skin.

The poisons from the coccus are carried to all parts of the body. These poisons cause headache, general aching, fever, rapid pulse, and delirium.

White blood corpuscles are charged with the task of fighting the infection. A blood examination shows a great increase in these white cells. The physician who wants to know what sort of a fight his patient is putting up examines the blood and forms his opinion largely on the number and variety of the white blood cells found.

Strange to say, the cocci have not much tendency to travel into the deeper parts of the body. Occasionally they get into a joint causing what

formerly was called rheumatism, but they do not go much beyond that. They do not travel to the heart to cause heart disease nor to the kidney to cause Bright's disease.

When a person recovers from erysipelas he recovers completely. No trace of disease is left behind.

The fever may be high, the pain great, the delirium considerable. The person may appear to be gravely ill and yet complete recovery can usually be expected. The skin may be so swollen that the features are obliterated and yet no suppuration occur.

The lymphatics open into the blood vessels. They are designed to pick up material from the tissues and discharge it into the blood stream.

Why is it that these lymph vessels do not discharge the streptococci into the blood stream? Why does not heart disease follow erysipelas, as so frequently happens after scarlet fever, pneumonia, and some forms of rheumatism?

The reason is that the cocci are different. Because they hang together in chains, they are called streptococci. Many of the cocci which cause rheumatism are streptococci. The pneumonia coccus may form chains. The germ of scarlet fever may be a streptococcus. This means that, because a group of bacteria is alike in that they hang together in chains, it does not follow that they are alike in other particulars. Erysipelas, though due to a streptococcus, is not usually followed by heart disease.

Recovery after erysipelas may be expected. There is no specific treatment for the disease. Some day we shall have a remedy which will kill off the cocci in the lymphatics, but that time has not come.

If the opinion be formed that a man with erysipelas can get along without medical attention harm will result. Symptoms demand treatment. There is need for counsel as to how to sterilize the hands and clothes of attendants, as well as how to conserve the vitality.

Diseases of this group are more in need of skilled medical service than those diseases for which specifics are known and no special skill is required to administer them.

YELLOW FEVER

LAST YELLOW FEVER REGION

Yellow fever is a memory with us. If by chance it were to come to this country few physicians would know it from malaria and other fevers. Probably not one physician in a thousand ever saw a case of yellow fever. Yet at one time it went up the Atlantic seaboard to Maine and up the Mississippi Valley to Cairo.

In 1693 the disease was in Boston and the New England states. On October 16, 1749, Benjamin Franklin wrote from Philadelphia to his mother in Boston:

"Pray tell us what kind of a sickness you have had in Boston this summer? Besides the measles and flux, which have carried off many children, we have lost some grown persons by what we call yellow fever, though that is almost, if not quite, over, thanks to God, who has preserved all our family in perfect health."

In 1900 Guiteras wrote that yellow fever was never absent from Havana, Vera Cruz, and Rio. Each one of these places is now free. The only fever foci left lie just below the Panama Canal Zone. However, from these places the disease is liable at any time to reach the United States.

Yellow fever is caused by the bite of a mosquito that has been infected by previously biting a person suffering from yellow fever.

About five days after the mosquito bite yellow fever comes on with a rush. In its beginning there is nothing of the gradual stealing on of typhoid fever. The fever is highest at the start. There is usually a chill and the aching in the head and back is fearful. The pulse is not so rapid as the fever would indicate and it gets slower day by day even though the fever is staying nearly the same. The face is flushed and note this: a little jaundice comes within the first twenty-four hours.

Another point of importance is that early in the disease the urine contains albumin.

The disease is called yellow fever because of this peculiar lemon-yellow jaundice. After about three days there is a let-up for a day and then comes the second stage of fever—the stage of collapse, of shock, of black vomit.

It is not an easy disease to diagnose. Some of the most violent fights I have ever known were fights over the diagnosis of yellow fever and that, too, by well trained men of broad experience with yellow fever. At autopsy the boxboard liver is so characteristic that the contending diagnosticians generally let the autopsy liver settle the argument.

I hope that we may never again have yellow fever in this country. We have kept cholera out of the country since 1873 and we have been almost as successful with plague. Our influence has been great enough to banish the disease from all Central American countries. Rio and the eastern portion of tropical South America have been cleaned up.

The little fringe of infected country along the north and northwest coast of South America is the last stronghold of yellow fever in the world. If that can be cleaned up simultaneously yellow fever will disappear for all time. As it is, we know just how to control the disease, just what to do and what not to do.

In the light of all this the only chance for yellow fever to disturb us is for it at some time or other to get a good start on us because our young and middle-aged physicians have never seen yellow fever and our old ones have forgotten it.

Cause of Yellow Fever.—*F. R. K. writes: "Will you publish the facts about yellow fever? First, is it contagious without the bite of the mosquito? Second, give the name of the army surgeon who demonstrated that the mosquito was the carrier of the disease, and the conditions connected with the surgeon's death."*

Reply.—1. Yellow fever cannot be contracted except through the bite of an infected mosquito.

2. The army surgeons who made this demonstration, using their own persons as well as the persons of other volunteers for the purpose, were Drs. Reed, Carroll, Lazear, and Agramonte. Dr. Lazear died from yellow

fever due to experimental infection by the bite of an infected mosquito. The theory that mosquitoes conveyed yellow fever had been advocated for several years prior to the demonstration referred to above by Dr. Carlos Finlay of Havana.

MALARIA

CAUSES OF MALARIA

The word "malaria" means bad air, and the disease was so named because it was supposed to result from miasmas which exuded from the soil into the air.

We now know that the disease is caused by the bite of a mosquito that has previously bitten a person sick with malaria.

Only one variety of mosquitoes can carry malaria, the anopheles. Only the female anopheles is a malaria host. In the spring the percentage of infected mosquitoes is small. At the height of the season not over 25 per cent of the anopheles are infected.

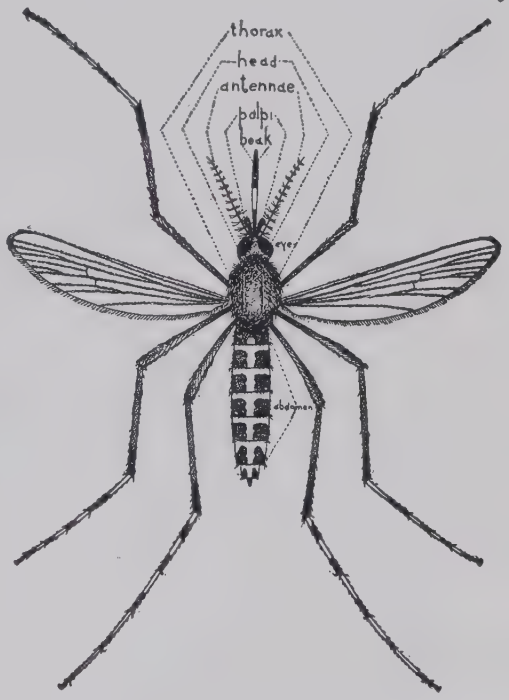


FIG. 114.—ADULT FEMALE MOSQUITO, SHOWING PARTS.

If a man is bitten by a mosquito at night there is more than an even chance that the mosquito is not an anopheles; in the day the chances are fifty to one. If the night biter were an anopheles, there are four chances to one that the female was not infected.

The reason is not far to seek. A man with violent malaria has one parasite to about 100,000 red cells. If his malaria is not violent, he does not have one parasite to 10,000,000 red cells.

There is a pretty good chance that Mrs. Mosquito will fill up with blood drawn from a malarial man and not get a single parasite.

Then, many of the parasites taken in by mosquitoes die without evolving. Many infected mosquitoes die in less than ten days. The great majority of infected females which live longer than ten days after infection never get a chance to bite a susceptible man.

In Ross's "Prevention of Malaria" the probabilities of each phase of infection are worked out mathematically in a most interesting way. It is his opinion that not over one twenty-fourth of the female anopheles stand any

chance of infecting men. Nevertheless, proper planning to control malaria includes procedures to prevent mosquitoes from biting sick people, and also to prevent infected mosquitoes from biting well people.

Infected people must stay behind screens during the night hours. The screening must be eighteen to twenty meshes to the inch and free from holes. Gorgas tells us that an ordinary carpenter will not put a screen in so that it is mosquito proof. Men have to be especially drilled before they will take the pains necessary.

The well may take some risks from leaky screens; the malarially infected must be kept behind screens that work.

Fortunately, after gorging, mosquitoes do not try so hard to get out as they tried to get in. If the screens have leaked the blood-gorged females can be killed the next morning. This is early enough, if the person bitten is sick and the mosquitoes are the newly infected parties. If the person bitten was well and the mosquitoes biting were infected, the next morning is not early enough. The deed was done, the chapter closed at the time of biting.

Mosquito repellants are of little service against malaria mosquitoes. Doty tells us that to smear the face and hands with oil of citronella, one ounce, and liquid vaselin, four ounces, will keep the pests away for a while, but that it will not last through the night.

A good community policy is one that encourages the people with malarial fevers to come into the hospitals. The community can be certain of the screening in the hospital. The chances are that the poorer people sick at home will be in unscreened rooms.

DAY-BITING MOSQUITOES

Fortunately for us, the mosquitoes that carry disease are a timid lot. The bold buccaneers, the day biters, the loud singers, and the awe-inspiring, elephantine gallinippers, none of these carries disease. They are nuisances; they cause irritating bumps; they even lay the foundation for blood poisoning through skin scratched raw, but they do not transmit either malaria or yellow fever.

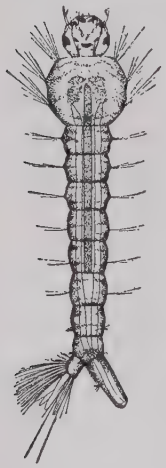


Fig. 115.—Larva.

The yellow fever mosquito is a city cousin, but as timid and diffident as a "sissy." The malarial fever mosquito is insistent and bold enough in the hours of darkness, but harmless as an owl in the daytime. But even an owl, when half starved, will try to kill in the day sometimes.

All winter anopheles (malarial mosquitoes) have been hibernating in cracks around houses and barns, under floors, anywhere to rest unobserved, asking only to be kept fairly warm and let live. Now that the warmer weather has come, their blood runs warm and hunger quickens. They fly out of their hiding places and search for food. Hunger makes them bold.

During the first month of mosquito time, anopheles are day biters. As they are numb from cold at night they are practically exclusively day biters.

They bite some people who have been having chills occasionally through the winter. The malarial organisms in the blood of those people have been

having a hard time keeping alive. Their blood home for the winter has been about as "poor pickings" as mother mosquito has had.

However, once those parasites get into mother mosquito they quicken into life; they take on snap and ginger; they are full of fight.

Mother mosquito will live to see only a few warm spring days. Death is waiting for her around the turn. Ten days are required for those parasites to change into young, vigorous, aggressive fellows. Can it live out the ten days? There is one chance in ten it will.

Can it live on a few days more and bite some in whom these parasites can live vigorously? There is one chance in twenty of that, say a combined chance of one in two hundred. So there is danger from day-biting mosquitoes in the spring, in the first month of mosquito weather.

For the continuance of the malarial succession, two brood ovens have been run during the winter. The one is the poor, neglected man, white or black, who has been chilling occasionally all winter. He is much the more important of the brood ovens.

The other is the mosquito stock, the few that crawled into cracks last fall and that now pour out, crazed by hunger, by hunger made bold.

TO CONTROL MOSQUITOES

Malaria can be controlled without controlling mosquitoes. The yellow fever mosquito abounds in the Mississippi Valley as far north as Cairo, Illinois, but there has been no yellow fever for years because the mosquitoes are not infected. All through Illinois and Indiana, all along the Wabash, malaria mosquitoes (anopheles) abound, but there is little or no malaria, because the mosquitoes are not infected.

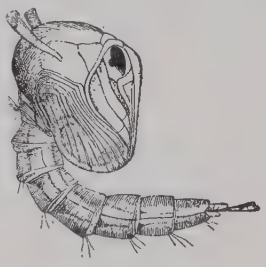


FIG. 116.—PUPA.

Routing malaria is much easier than routing mosquitoes. Let him who croaks that routing malaria is an impossible task, because of the difficulties of controlling mosquito breeding, learn another song.

Mosquitoes constitute the right wing of the battle line. The fight against that wing must be strenuously waged, but, when the colors have been captured, the wagon train burned, and the war brought to an end, it will be found that the right wing, broken and scattered, will be engaged in an irritating guerrilla warfare—no longer a malaria war, just a lot of bandit and freebooter gangs.

The methods to prevent mosquitoes are several:

1. Drainage, particularly tile drainage.
2. The emptying of all buckets, barrels, and cisterns, small accumulations of stagnant water, such as puddles in hoof prints, collections in tin cans, etc.
3. The emptying of shallow pools, such as reservoir and stock pools in lots and pastures.
4. Proper sloping of ditches.
5. Proper tending of brush and grass in and around the ditches within 300 yards of the house.

6. The application of oil to all breeding places after the following plan:

Mix 100 gallons of stove distillate and 5 gallons of crude oil. Spray with a special spray every fifteen days from April to November. In July, August, and September spray every twelve days. Crude oil is 12° to 18° Baumé, stove distillate, 28° to 32° Baumé. In hot weather the proportion of crude oil may be increased somewhat. The effort should be to cover the water with an unbroken oily film. The method of applying recommended by Herms is with a five-gallon knapsack spray pump.

7. Treating waters where green scums grow with sulphate of copper, not over one grain to a million of water.

8. Encouraging mosquito killers. Of such are dragon flies, snake doctors, bats, bullbats, and leather wings, and possibly some birds.

9. The encouragement of fish which live on wiggletails. Of such are minnows, shiners, and goldfish. In foreign countries several varieties of fish have been found efficient. The probability is that the imported fish will not prove so satisfactory as native fish. The minnows found locally will be more apt to live and multiply, if given a chance, than will species brought in.

HOW TO KILL THE MOSQUITO BREED

Dr. Darling of the Board of Health laboratory on the Canal Zone advises the following mixture to kill the young in their breeding places:

"One hundred and fifty gallons of crude carbolic acid (sp. gr. 97 containing not less than 30 per cent tar acids).

"Two hundred pounds of finely crushed and sifted resin.

"Thirty pounds of caustic soda.

"Six gallons of water.

"The carbolic acid is heated in an iron tank with steam under fifty pounds pressure. Then the resin is added and finally the soda, dissolved in the water, is poured into the mixture of acid and resin. The mixture fills three and one-half barrels. It costs 14 cents a gallon, including heat and labor. One gallon in 5,000 will kill mosquitoes, larvae, pupae, and eggs.

"On a smaller scale: Mix one gallon crude carbolic acid, one and one-third pounds of resin, one-fifth pound caustic soda, and one-third pint of water."

With ordinary mosquitoes the egg period is thirty-six hours, the larvae seven days, the pupae two days or a total from mosquito to mosquito of ten and a half days.

Darling says this "dope" should be used every seven days. If there is much growth in the water, particularly green scum, this takes up a good part of the larvacide, but enough remains to be effective for about seven days. When the mixture is fresh, the eggs and larvae are killed in a few minutes. If there is much growth of algae (green scum), the larvae are destroyed within forty-eight hours, that is, during the first seven days after the mixture has been used.

Of course, where it is possible, the proper plan is to get rid of the breeding place. In a city this is easier than it seems at first thought. The usual breeding place in a city is some such container as an oyster can, or a slop jar, or the reservoir for the toilet in the bathroom, or the tank on the house.

Mosquito repellants are not of much service. They work when freshly applied, but they speedily lose their efficacy. One is kept about as busy smearing his hands and face with "dope" as he would otherwise be in fanning mosquitoes away.

Where mosquitoes are not infected they are still objects of interest. To prevent mosquitoes from biting, Howard recommends:

Oil of citronella	1 ounce
Spirits of camphor	1 ounce
Oil of cedar	½ ounce

A few drops of this on a towel at the head of the bed will answer if the mosquitoes are not especially hungry. To rub some on the face and hands is better. If the mixture has evaporated before morning and the mosquitoes are no longer kept at bay, substitute for it the following:

Oil of citronella	1 ounce
Liquid vaselin	4 ounces

Or

20 drops of oil of citronella to an ounce of vaselin.

To ease the hurt of a bite, use soap. Moisten a cake of toilet soap and touch it to the bite. Ammonia is a fairly good substitute.

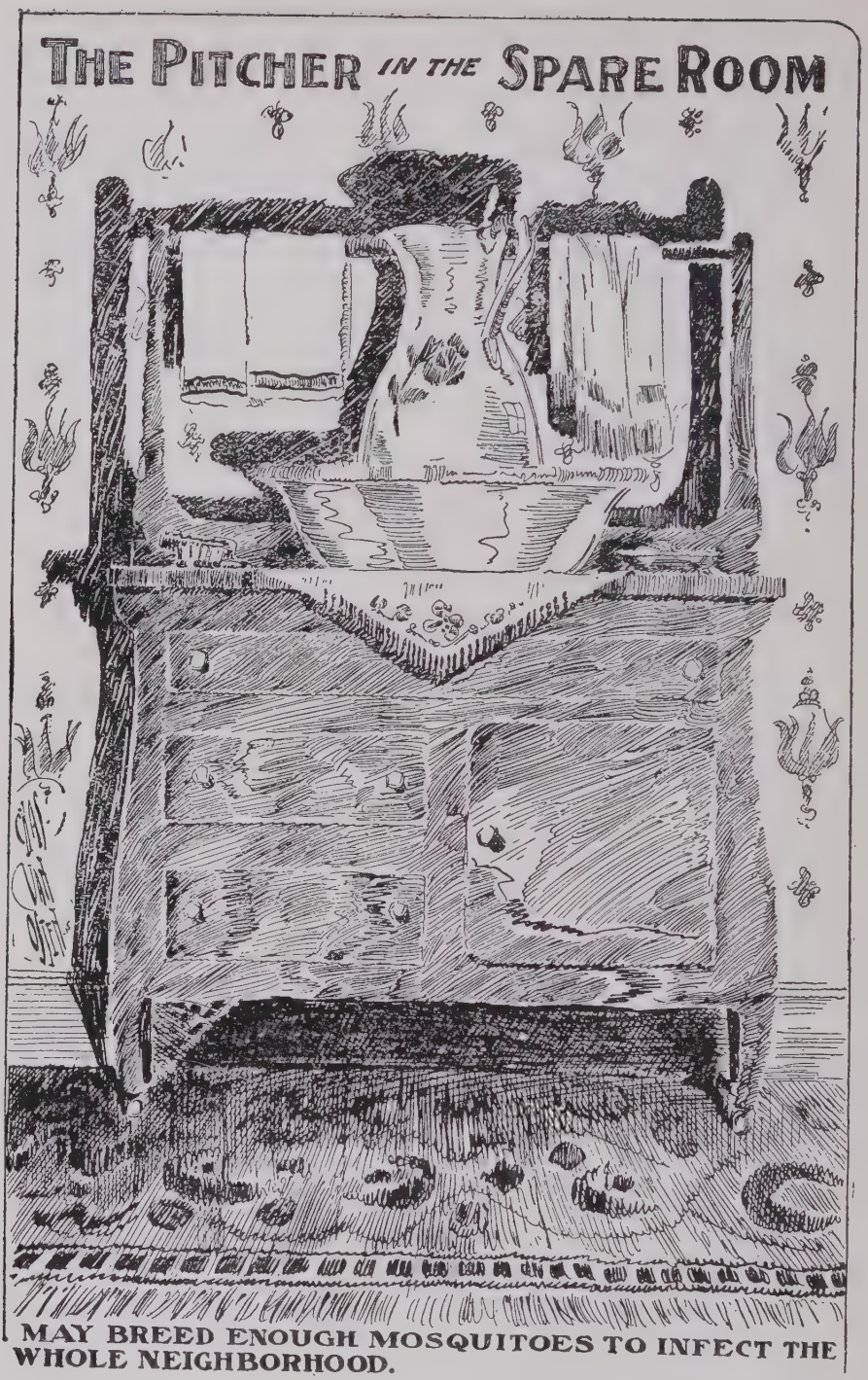
Gorgas tells us that, as a rule, mosquito bars and screens do not keep rooms wholly free from mosquitoes. In a malarial country enough will get through ordinary screening to infect. Mosquitoes are persistent and they are certain to find imperfections in the screening. Howard tells us to use bars and screens with twenty mesh to the inch and not to try anything less than fifteen.

But the great shortcoming is in the cracks around the screen. Gorgas says that an ordinary carpenter will never make things mosquito proof. Howard advises that where bars are used one should not retire until he has gone over his mosquito bar with needle and thread and patched the holes.

To catch the mosquitoes in the room the following method is used: A cup is nailed through its bottom to the end of a broom handle. A teaspoonful of kerosene is put in the cup. It is easy to catch the mosquitoes resting on the ceiling with this. A glass tumbler fastened to a stick has been used in the same way.

Mosquitoes are not travelers. Rarely do they go, or are they carried, more than 800 feet. If a wind storm is brewing, the mosquitoes will seemingly sense it early and get into cracks and under leaves.

The man who keeps his premises free of mosquito breeding places for a distance of 300 feet from his house will have little trouble with mosquitoes. To keep pools free from wigglers, sprinkle with oil about once every two weeks in hot weather. Use a mixture of four parts of heavy crude oil and one part light. The oil on the surface must remain unbroken. A spray is the best method of applying. A sprinkling can will do. If there is a fountain or pool in the yard, keep goldfish or top minnows in it.



Florida Health Notes.

FIG. 117.

If a neighborhood or village wants to know how to run a mosquito campaign, let some one get Herms' "Malaria" and read how some California communities campaigned.

HOW MALARIA SPREADS

This is the child who had a chill.
This is the mosquito that bit the child who had a chill.
This is the man who was bitten by the mosquito which bit the child who had a chill.

To stop the sequence cure the man who infected the mosquito which bit the child who had a chill.

The malarial parasite gets into a blood cell, where it grows until it is full size, whereupon it divides into a dozen young ones. The chill occurs when the young ones are formed. A single dividing germ in a man's blood will not cause a chill. One and a half millions are needed. When one gets in it multiplies for a while without any chills; when there get to be one and a half millions of them there is a chill. So long as the number keeps over that figure the chills and fever keep coming; when it drops below the chills and fever stop.

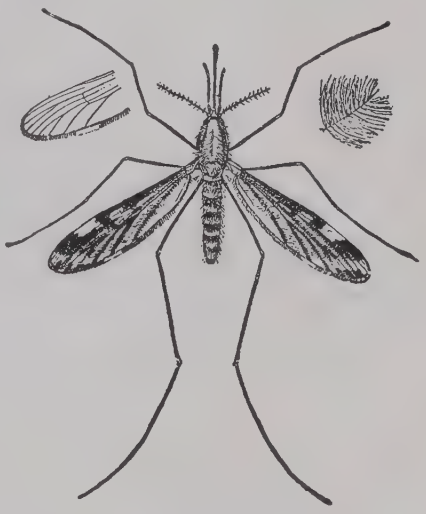


FIG. 118.—ANOPHELES.

The man may be "no account" and weak, or he may even be feeling well. A malarial mosquito biting him during this time is fairly liable to draw in one or more malarial organisms, even though they are scant. After ten days this mosquito can transmit malaria just as well as one that had bitten a man having chills and fever.

This tendency of the malarial parasites to remain in an infected man, few in number and not extremely active, makes the greatest obstacle to the eradication of the disease. Such cases are called cases of chronic malaria, relapsing malaria, etc. They are half cured cases; cases cured enough to stop the attacks but not cured enough to do away with the danger of an attack next month, not cured enough to prevent mosquito infection.

The remedy is to take quinin enough and to continue to take it long enough to cure the disease wholly, not half cure it. In mild cases thirty grains a day for a week, then twenty grains a day for a month, then arsenic and iron for three months will do it.

Most people know how to stop chills. Some of them go to doctors, some of them do not. Whether they treat themselves or go to physicians, they take twenty grains of quinin a day for three days. That method stops the chills for that week, or maybe for three weeks. If they stop at that they are liable to

chill again after a month or so. The malarial mosquitoes biting them will become infected and may spread the disease.

The only fair policy is to continue the quinin until the cure is completed and then to build up on iron and arsenic. Koch thought this one the most important of the three methods of preventing malaria.

In Italy efforts at mosquito control cut the malaria rate from 70 to 16. There it hung until they added a quinin policy to their mosquito policy, whereupon it speedily dropped from 16 to 4.

The quinin policy consisted in giving quinin free to everybody who could not buy it and fixing a cheap price by law for those who could buy.

HOW TO END MALARIA

When the temperature of the atmosphere remains below 65 degrees for a while mosquitoes become inactive. Those females that are infected with malaria become harmless, for the malarial plasmodia within them fail to develop. This being true, nobody will be infected with malaria until next spring.

The malaria to keep the disease going is now stored away within human bodies. *If the malarial people could become nonmalarial it would not matter how many mosquitoes or frog ponds we had next spring.*

When the malarial parasite gets into the blood it begins to develop young. These young are now in the asexual form of the malarial plasmodia. This asexual form causes chills and fever.

In about two weeks, when left to itself, in addition to the asexual or chills and fever form the plasmodium also begins to develop sexual forms. The sexual forms infect mosquitoes.

The chill and fever producers, the brothers to the sexual forms, cannot infect mosquitoes. This being true, if a man would start taking quinin quickly, as soon as he got malaria, he could never infect mosquitoes.

This sexual form, when taken into a mosquito, develops into a form capable of infecting man. If it remains in the body of a man, is not sucked into a mosquito, after a few days it locates in the liver or spleen or bone marrow, where it lies dormant. Many of them die off from old age when they get to be six weeks old. These old, hardened sexual forms are not easily killed by quinin.

Now that the temperature is below 65 much of the time, the mosquito is out of it. Can anything be done to clear up the mosquito foci before spring?

Bass says: "All that is required for the complete eradication of malaria is for everybody who had malaria during a warm season to take the proper amount of quinin on each of two consecutive days in each of six consecutive weeks during the following cool season."

Suppose every person who had an attack of malaria last summer would begin in the middle of November and take twenty grains of quinin a day each Saturday and Sunday until the first of January.

If Bass is right—and Bass knows malaria as well as anybody in the world—there would be no malaria next spring and summer. There might be a few ague subjects too much malaria-soaked to be freed of the parasites by twelve treatments. Some of these would need iron and arsenic tonics and quinin continued over more than six weeks.

However, even if a moderate number of ague case people were not cleaned up, the chance that the disease would disappear would be great. The history of malaria teaches that when the foci have become few the disease tends to disappear.

HOW TO CONTROL MALARIA

The method of controlling malaria consists of three parts. Each is important. No one can be omitted without increasing inefficiency, increasing the ultimate cost and prolonging the time required for results.

1. To prevent the breeding of mosquitoes.
2. To prevent the infection of mosquitoes by people.
3. To prevent the infection of people by mosquitoes.

To prevent the breeding of mosquitoes, it is proposed: (a) To drain the land; (b) cut out the grass and underbrush; (c) catch mosquitoes with bats and birds; (d) catch the larvae with fish; (e) catch the mosquitoes in the houses, particularly the last crop in the fall and the first crop in the spring; (f) to kill the larvae with oil, nicotin, and other compounds.

FIG. 119.—DEPOSIT OF EGGS OF THE ANOPHELES (Howard).

As malarial mosquitoes can only travel short distances, and as they only bite at night, all that is needed for results is to see to it that mosquitoes do not breed within 100 yards of human habitations. A man can protect his own household if he will look well to mosquito prevention in the 40,000 square yards around his own house, however careless his neighbors may be.

To prevent the infection of mosquitoes by malarial people:

1. Measures should be taken to keep down mosquitoes.
2. Effective screening of the infected, especially at night.
3. Complete cure of those who have malaria—the Koch plan of sterilization of the blood by quinin.

The third part of the plan is to prevent infected mosquitoes from infecting people. The measures proposed are:

1. To prevent the breeding of mosquitoes.
2. To prevent infected mosquitoes from biting people by (a) keeping mosquitoes uninfected; (b) preventing infected mosquitoes from having access to people; (c) using prophylactic doses of quinin.

However, individual effort is no more satisfactory than is boiling the water by the individual successful in keeping a community from having typhoid. Not much will be accomplished until mosquito surveys are made,

sanitary inspectors are employed, oiling squads are used—the methods proved in Havana, in Panama, and in California.

Every part of this plan has been demonstrated. Just what to do and ways of doing it have all been tried out.

ERADICATING MALARIA

Treatment of malaria as a community disease is composed of three parts —the prophylactic use of quinin, the thorough cure of the infected, the Koch method, and control of mosquitoes. For a badly infected district all three are necessary. For a mildly and intermittently infected district, in the Mississippi Valley, say, north from an east and west line through Cairo, and in most of the country south of there, only the second and third procedures are advisable.

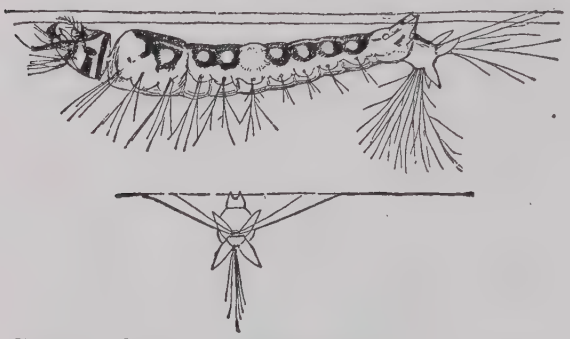


FIG. 120.—POSITION OF ANOPHELES LARVA IN OBTAINING AIR (Howard).

Not much of value relating to the control of malaria came out of the Washington meeting of the International Congress on Hygiene and Demography. In one warm informal discussion the success of mosquito eradication in Panama was brought into question. Proof that the mosquito work in Panama was effective was overwhelming, and the English doubter retired from the field rather worse for wear.

Dr. Le Prince's paper set forth that, mosquitoes not being able to travel against the wind, in a district where the winds blow steadily in one direction an infested community can concentrate its efforts on the marshes which lie to the windward.

Ruge put a good deal of stress on fighting mosquitoes out of season. The race is kept alive by adults that get into warm places and live through the winter. He advocated fumigating all houses at least once during the winter by burning pyrethrum powder in them and sprinkling with Giems' solution. He advised that whenever it was necessary to keep water around the house in cisterns or like places minnows should be kept in the water. All unnecessary water catchers, such as bottles, tin cans, fountains, small ponds, should be done away with. Ditches and ponds that cannot be drained must be oiled.

Sergeant said that in North Africa they required that irrigated districts be allowed to dry out at intervals less than the life cycle of the mosquito, the idea being that the eggs deposited and the larvae developed from them would be destroyed before maturing time. Several towns in Constantine, Sahara, have been moved bodily by the government from an unhealthy site to a new one provided and made healthy by the authorities.

There seems a fair chance that the Mediterranean country will have eliminated its malaria by the time ours is gone. Perhaps by that time South America may be in a fair way to clean out its foci.

CURE YOUR MALARIA

In the United States malaria is one of the fast disappearing diseases. In another generation it should be as rare in the gulf states as it is in Illinois today. Half a century ago the New Englander was afraid to emigrate to Illinois on account of the dreaded malaria. The more active the efforts made to control this disease in a malarial region, the more quickly the disease will disappear.

Fall is the most important season from the malarial standpoint. The people who have been repeatedly bitten by infected mosquitoes are in greater danger of losing their lives now than earlier in the season.

After each infection they have taken enough treatment to stop the chills, but not enough to kill all the parasites in the blood. In consequence many of them have a few malarial parasites of the tougher kind in their spleens and livers.

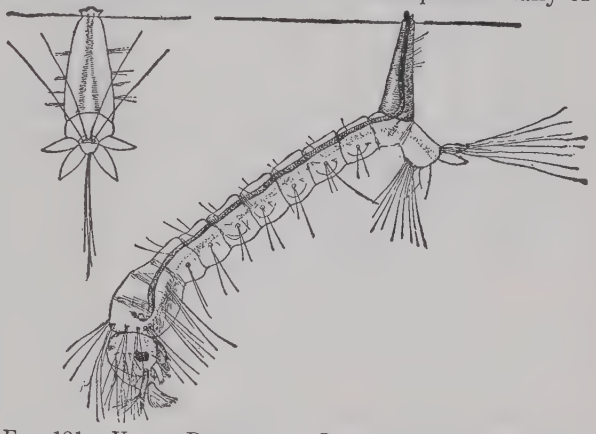


FIG. 121.—USUAL POSITION OF LARVA IN OBTAINING AIR (Howard).

In certain phases of the life of the malarial parasite quinin is a deadshot remedy. In other phases the parasite is not so easily killed by quinin. In the fall those who have been chilling from time to time are liable to have outbreaks of malignant malaria.

King, in writing of malaria in central Africa, says: "The cold weather brings out the fever in those natives who have suffered from it in previous months."

Rosenau tells us that as the troops returned from Cuba after the Spanish war "many cases of malaria broke out among those previously in good health upon reaching the cold winds about Cape Hatteras."

It is wise to cure one's malaria as completely as possible before going into the winter, to cure it up with plenty of quinin followed by an arsenic-iron tonic. This policy is wise from the standpoint of the individual. It is also wise from the standpoint of the community.

The mosquitoes that are to carry over into next year are searching out sheltered places in which they will manage to keep alive through the winter. Those that come out next spring will be free from malaria infection. Mosquitoes have such a hard time in living through the winter that it is certain the sick ones will die.

If there is to be any malaria next spring the mosquitoes to spread it must get infected. They will get infected through biting the people who now have malaria in their blood and who will go through the winter only half cured, having chills once or twice but feeling fairly well most of the time.

After the intelligent people have cured themselves completely it would be

wisdom as well as charity to help the less fortunate people to get a complete cure.

HALF CURED MALARIA

Mosquitoes capable of spreading malaria are found all over the United States. They are a great annoyance, and as such they should be prevented, but when uninfected they cannot spread malaria. They must be sinned against before they can sin. As they are uninfected in the upper Mississippi Valley, there is no health reason for paying any attention to them.

So much for the general run of towns. Any place which is a summer resort for half cured "malarias" had better take care of its mosquito problem to prevent breeding, or, failing in this, to prevent them from becoming infected. It has a health as well as a comfort reason.

The visitor to Havana is impressed by the promptness with which the oiling squad turns out after a rain. Within a few hours the little puddles of water, the tin cans, every little accumulation, are oiled. These efforts are important, but they are no more important than seeing to it that no malarias are left half cured.

During the days of chills and periodic fever—say, May, June, and July—most people know the need of keeping mosquitoes away from the sick. Some do not know or do not care. But the custom is to give quinin for three days only, and this is not long enough to sterilize the blood completely, particularly after August 1. Dr. Henson, in the *Journal of Tropical Medicine* for February, 1912, says twenty grains a day for three weeks will completely sterilize the blood when fever is intermittent in type, and thirty grains when the fever is of the type found in the autumn—the irregular type.

Thirty grains of quinin make one feel far from comfortable. To ask a malarial subject to keep it up for two or three weeks is asking a good deal, but then to ask a "chiller," a big-spleened sufferer from latent malaria, to stay behind mosquito bars all of the time is asking a good deal. Asking people to get vaccinated, to keep diphtheria quarantine after they feel well, to burn the sputum in all coughs and colds—all of these things ask a good deal.

A badly infected malarial section labors under a great handicap. The land sells below its value. There is some hazard to life. *Malaria is a bar to prosperity.*

If a man is willing and anxious to be quininized for three days for his own good, he ought to be willing to make it three weeks even if the last two weeks is 75 per cent public good and only 25 personal good. *Why not indulge in fewer windy words about dying for one's country and put in the time getting cured for one's country?* Foreign enemies are bad, but men with half cured malaria are worse.

THE COST OF MALARIA ON A PLANTATION

A Department of Agriculture newsletter to crop correspondents tells of an effort made on a plantation in Louisiana to find out the cost of malaria to the planter and his hands. One thousand eight hundred acres of this plantation were farmed, mostly by tenants working on shares, though there were some day hands. One thousand seven hundred and forty acres were uncleared

swamp land. The department estimates that the conditions were the same as on 200,000 acres of cultivated land in other parts of this country.

The plantation physician treated members of forty-six out of sixty-four families during the year for malaria. The loss from loss of time to the owner was $3,835 and to the tenants $1,115. Had malaria been eliminated, the manager figured, the income of each family would have been increased $24. He thought forty families entirely free from malaria could do the work of the sixty-four families, sick as they were.

The harvest seasons in that section come just as malaria is at its worst. In the sections where boll weevil now is, the people are suffering double loss from malaria.

In the old days, when the crops had been laid by there was not much to do until the gathering time commenced. If the hands were laid up with chills, not much money was lost. When boll weevil is around, the crops must be cultivated after the old "laying by" season in order to keep ahead of the weevil.

The writer of this letter thinks the most effective method of prevention is complete cure of the sick. He does not think it possible properly to screen negro cabins or to keep mosquitoes away by bars over the beds. The drainage of the lands will require many years. But if the cases of malaria are completely cured, the mosquitoes cannot become infected.

Fig. 122.—Culex Pungens, or Common House Mosquito: Female (Howard).

Concentrating on people sick with malaria, seeing that they get quinin free if not able to pay for it, and at a low price under other circumstances, is the method of control of malaria which is proving so effectual in Italy. The letter says that in the ultimate control drainage would probably play the greater part.

To distinguish the malaria mosquito from the other varieties, the letter says, it is only necessary to notice its position as it bites. The biting malarial mosquito lifts the hind end of the body and hind legs from the skin. The ordinary mosquito stands on the skin with all its legs.

USE OF QUININ

To spread malaria the anopheles mosquito must bite a person in whose blood the malarial organisms are ready for the mosquito stage. In the blood sucked up there must be malarial parasites, for not every blood cell, nor even every hundred cells, contains a parasite. The mosquito must live for ten days while the parasite is getting ready for man again, and then the mosquito must discharge the young parasite into the blood of a susceptible man.

To render the blood of men unsusceptible to malaria small daily doses of quinin are used. In the Panama Canal Zone the three-grain chocolates of quinin are kept on the eating tables. Of the 40,000 people in the zone 20,000 use this prophylactic quinin daily. The quantity taken is nine grains—three grains three times a day.

The proper plan is to begin taking quinin this way when the mosquito season opens and to keep it up until the mosquito season closes. The tannate and other tasteless forms of quinin seem to work just as well as the bitter forms.

Bartholow says that in the Civil War every soldier in the army of northern Virginia took a measure of quinin and a jigger of whisky every day and that it was good "neither morally nor physically." The judgment of the men in charge of the malaria campaigns in Italy, Algeria, and in Panama is that Bartholow was wrong, at least so far as the quinin was concerned.

FIG. 123.—MANNER IN WHICH THE EGGS OF THE CULEX PUNGENS, OR COMMON HOUSE MOSQUITO, ARE DEPOSITED (Howard).

To the International Congress on Hygiene, Celli, speaking of Italy, said:

"The prophylactic administration of quinin has reduced the malaria rate to the minimum."

Sergent, from Algiers, said: "In Algeria the government distributes three-grain quinin tablets free of charge."

Ruge, from Kiel, advocated the preventive use of quinin.

Gorgas, speaking of Panama, says:

"Prophylactic quinin is furnished in three-grain doses either in a solution in the form of a tonic or in pills. It is placed on the table at all the messes, given to any employee who applies for it. Besides we have from one to three dispensers in each district, who go around to the various villages, offering quinin to all employees who will take it. We look upon prophylactic quinin as a most important measure."

They use about 500 pounds of quinin a year in the Canal Zone.

The question arises: By whom should prophylactic quinin be taken? The answer is: Everybody living in a highly malarial district. If anyone stays behind screens every night during the malaria season he may omit quinin with safety, but others cannot. Negroes and poorer whites living in unscreened cabins should take it from spring until fall. The better-to-do can well afford to see that the poorer people get it without cost.

Keep clear the distinction between the large doses needed to cure an infection and the small doses to prevent one.

OUTLINE OF MOSQUITO WORK

1. Find the breeding places.

2. Destroy all bottles, cans, and buckets capable of catching water. They serve as breeding places.

3. Fill up the cow tracks and ruts.
4. Drain the small pools and puddles.
5. Drain the marshes.
6. Clean out and straighten the ditches.
7. Clean and slope the ditch banks.
8. Tile ditches, whenever possible.
9. Screen all tanks and water barrels with No. 18 mesh screening.
10. Tag the breeding places which cannot be drained, emptied or destroyed.
11. Oil the breeding places.
12. Oil once every three weeks in cool weather.
13. Oil once every two weeks in warm weather.
14. Oil once every week in very hot weather.
15. Oil after every hard rain.
16. Oil after every very hard wind.
17. Cover the entire surface of the pond with a thin film of oil.
18. The oil mixture to be used is a combination of kerosene and crude oil.
19. When a spray pump is not available a sprinkling can may be used.

Fig. 124.—Culex Solicitans, Salt Water Swamp or Striped-Legged Mosquito: Female (Howard).

20. One ounce of oil properly used is enough to cover fifteen square feet of water with a thin film.
21. In cooler weather the oil mixture used can consist of three parts kerosene and two parts crude oil. In very hot weather the mixture should contain twelve parts crude oil to ten of kerosene.
22. Grassy marshes where an inch or more of water stands in the grass are especially in need of oiling.
23. Special attention should be paid to small accumulations of water.
24. Water liable to serve as a breeding place and which cannot be emptied should be treated with larvacide.
25. A good larvacide made from tobacco can be had from tobacco firms.
26. Bodies of water which can neither be oiled nor treated with larvacide can be kept free of mosquito larvae by stocking with fish. Native minnows are best.
27. Mosquitoes rarely make their way across open ground for a distance of more than 100 yards. Therefore, if mosquitoes do not breed within 300 feet of a house they rarely cause great discomfort therein.
28. Female mosquitoes, the biters, live for a month or two. They work their way through the woods and dense grass. They hide in heavy cover.

29. Clean the vines and bushes away for a space of 100 feet from the house. Vines on the wall are excellent hiding places for mosquitoes.

30. Screen porches with No. 18 gauze.

A MOSQUITO CAMPAIGN

New Jersey has a reputation for mosquitoes. In 1911 the legislature decided that the reputation was doing the state harm, and it therefore passed "an act for the establishment of county mosquito extermination commissions."

In April, 1912, Union County organized its commission. The budget for that year was $28,000. The budget for 1913 was $26,000. In the first annual report of the commission there is a statement of the reasons why that county was willing to spend that amount of money in anti-mosquito work.

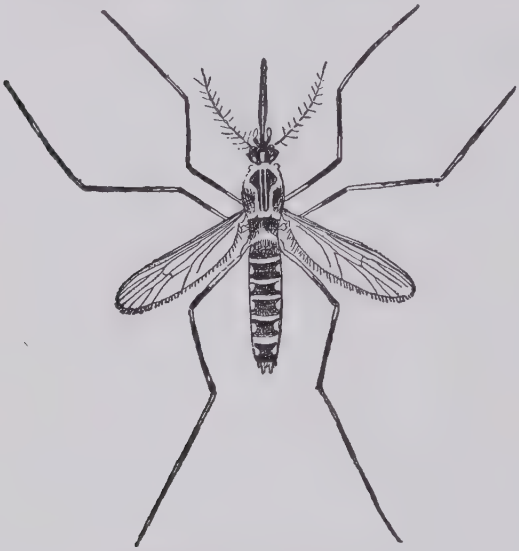


Fig. 125.—Stegomyia, or Yellow Fever Mosquito: Female (Howard).

It is said that mosquitoes cause some, though not much, disease in New Jersey. They are unpleasant pests, and they cause the people great discomfort. But the reasons for the activity are largely economic.

"Swamps that are useless now become fertile fields after drainage and a source of gain. Valuable building lots are made by filling in low lands, and once freed from the pests that have given New Jersey a bad name people will come to our county and establish their residence, and this means an increase in property values and prosperity."

Union County embraces a good deal of sea marsh land. The 1913 report shows that the better drainage of this land had materially increased the value of the hay crop, an economic benefit not included in the first prospectus.

It is infinitely more difficult to rid a sea marsh of mosquitoes than it is to get rid of them in an upland district. The rise and fall of the tides and the great expanses of grass-covered marsh with its multitude of sluggish ditches create conditions without parallel in upland work. If they can control mosquitoes the people of Chicago and vicinity would find their work of mosquito extermination child's play.

The report from Union County is that the mosquito pest is ancient history. More than a year ago all the district was practically free except a section of northeastern Elizabeth. In 1914 the city of Newark undertook to rid that district of mosquitoes since they came from a section of Newark meadow for which Newark, not Elizabeth, was responsible.

The Union County commission keeps three men at work cleaning out ditches and draining the salt marsh throughout the winter. Early in March it sets a gang at work cleaning out ditches on the salt marsh and another gang draining small pools in the upland.

About May 1 the oiling begins. About 2,000 sewer catch basins, stagnant pools and ponds, gutters, open cellars, slow-running streams, open manure pits, drains, and other breeding places were oiled once every ten days from May 1 to October 1. The cleaning of the salt marsh ditches began March 16 and was completed on May 20.

"Now is the time to start anti-mosquito work."

The statements quoted below are worth listening to because they are based on the experience of men who had a hard job and made good. The men referred to are the mosquito extermination commission of Union County.

Note this money benefit: "The amount of salt water hay harvested is growing greater every year." And this comfort benefit: "Hardly a single specimen of the salt marsh mosquito was seen in places where in previous years it was a pest."

The following statements would apply anywhere:

"The importance of the small breeding place is being realized more and more when the enormous number of barrels, open cesspools, and cisterns, tubs, pails, broken dishes, cans, etc., found each year is taken into consideration. Even in good neighborhoods dozens of these breeding places are found. In almost every factory yard from one to ten unused vats and barrels holding water can be found, serving no purpose except to breed mosquitoes.

"In the patches of gardens scattered throughout the cities, barrels and tubs to hold water are common. Around stables and in vacant lots miscellaneous collections of old cans, pails, etc., the dumping of many years, are plentiful. Any such breeding places can produce enough mosquitoes to keep the neighborhood for two blocks awake."

In the opinion of the writer of the report, most of the mosquitoes which infest residences are bred in water in small containers, and not in ponds and marshes.

The commission has noted sewage-polluted road ditches black with wigglers. Sewage pollution furnishes plenty of wiggler food. "One hundred times as much breeding will take place in polluted water as in clean." This may be true of ordinary mosquitoes. Yellow fever mosquitoes require clean water. Malaria mosquitoes prefer to breed in greenish water not very badly polluted.

About 200 premises were inspected each day by each city inspector. The country inspector had forty to fifty inspections as his daily task. An inspector was expected to get around his district, inspect every premise, once in fourteen days. "Although they found a very large amount of breeding, but few mosquitoes got on the wing."

"The kind of mosquitoes that infest your houses do not come from the salt marshes or large bodies of water, but in nearly every case they were hatched within 1,000 feet of your house, in some small pool or collection of

water. One rain barrel by actual count has been known to produce 16,800 mosquitoes in a week."

OILING TO PREVENT MALARIA

The workmen on the Canal Zone suffer very little from malaria. Dr. Watson, who has charge of the malaria work in the Federated Malay States, visited the Zone to study the methods in use there. He reported to the Royal Colonial Institute:

Fig. 126. — Anopheles, or Malarial Mosquito: Female (Howard).

"I concluded the results were mainly from oiling, which was done for practically half a mile on each side of the canal. The great majority of the population do not live in screened houses and very few take quinin."

Dr. Le Prince, who has had a broad experience in the Canal Zone, has devised a method for oiling running streams. He holds that, wherever draining is feasible, it will be found the cheaper as well as the more effective method for controlling mosquitoes. Where a film of oil can be made with a spray pump or a sprinkling can it should be done.

However, the question of oiling flowing streams arose with them as it does with others. Dr. Le Prince uses a homemade device made with an ordinary five-gallon oil can, a three-inch round nail, and a little cotton. The nail is driven through the bottom of the can from the inside out. A wad of loose cotton is wrapped around the nail just below its head and within the can.

The can is hung or otherwise held over the water. The drop should fall far enough before striking the water to cause it to break into a thin film on the surface of the water. By varying the pressure of the head of the nail on the cotton the flow of oil is regulated. The number of drops per minute should range between ten and twenty.

For kerosene and light oils one can use an oil can with a small spigot located on the side of the can an inch above the bottom. The handle of the discharge tap, or spigot, can be manipulated to regulate the rate of dripping.

In hot weather, when heavy oils are used, neither of these methods is very satisfactory. The grease clogs the opening after a little time. To obviate this the following plan was devised:

An opening is made in the side of the can about two inches above the bottom. A flange of thin metal, similar to that used in a lamp burner, is

fastened to the outside of the flat opening in the side of the can. A flat wick is run through the opening. Two or three inches of the inner end of the wick rest on the bottom of the can, and about half an inch of the outer end projects beyond the flange. An inch or two of water is placed in the bottom, and then the can is filled with oil. By pressing the flanges against the wick or by opening them out the rate of dripping is lessened or increased.

This method is especially adapted to small drainage ditches. It may be adapted to irrigation ditches. Several cans properly spaced may be placed in a row across a larger ditch.

A marshy place supplied by an oozing spring Le Prince would handle as follows:

A small bundle of oil-soaked cotton waste is placed on the wet ground at the point where the spring oozes out. It will give off a thin film of oil for a week.

Weeds and Malaria.—*Mrs. F. A. T. lives in a southern town within the malarial belt. The town has 2,500 inhabitants and is scattered over a large area. She asks the following questions: Do rank weeds growing on vacant lots where surface water is liable to stand cause malaria? There are many people ill with malaria, chills and fever both in town and in the surrounding country. How is malaria akin to typhoid fever? If a sewer system is installed it will cost about $18 per inhabitant and the sewage would have to be emptied into a sluggish river. Is there a substitute? Is the odor from stables injurious? How did the belief originate that "horses and hogs are healthy"?*

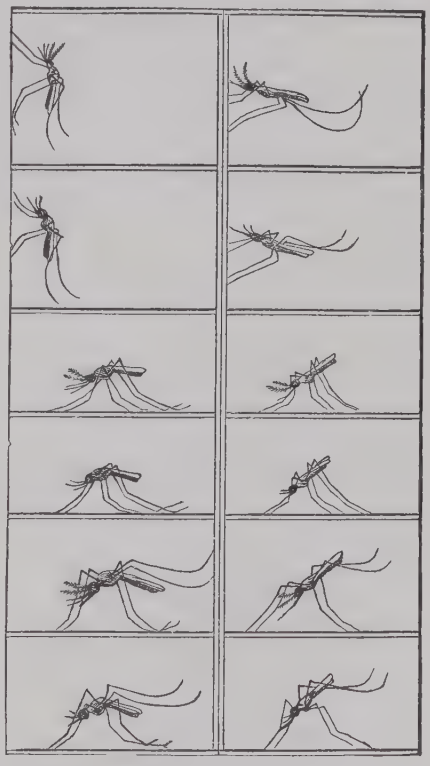


FIG. 127.—RESTING ATTITUDES OF THE CULEX (left) AND ANOPHELES (right).

REPLY.—1. Tall weeds contribute to the breeding of mosquitoes. They keep the ground from drying out and are responsible for small puddles of water in which mosquitoes can breed. A can of water will sometimes breed enough mosquitoes to spoil a neighborhood. There being cases of malaria in the neighborhood, these mosquitoes become infected and then spread the infection to other people.

Malaria reduces the price of every acre of ground in the district; it lowers the working efficiency of the people from 10 to 25 per cent.; it causes a good deal of sickness and some deaths; it prevents immigration. Therefore a malarial section is warranted in going to a good deal of trouble to get rid of mosquitoes.

The following plan should be followed: First, require that malaria be a reportable disease just like diphtheria; second, require that all people having malaria shall be screened from mosquitoes; third, insist that all those suffering with malaria shall be forced to continue taking quinin until fully cured, since half cured malaria is largely responsible in spreading the disease; fourth, screen dwellings against mosquitoes; fifth, cut weeds so that puddles of water may dry out; sixth, drain stagnant water; seventh, kerosene bodies of water which cannot be drained and which are mosquito breeders.

2. Malaria is not akin to typhoid. As malaria disappears from a section typhoid comes more to the front, but it is our opinion that typhoid was always present but was overshadowed by malaria during the years when malaria was rife.

3. If sewers are expensive for your town we suggest that ordinances relating to outhouses should be passed. These ordinances should require a permit for every yard closet and should specify the location with relation to dwellings and wells, also the style and type of building. A letter sent to the Public Marine and Hospital Service, Washington, D. C., asking for plans of the Stiles closet will bring a pamphlet telling all about it. It can be built for less than $10.

4. The odor from a stable is not injurious under ordinary circumstances, but there are places around stables in which flies breed, and this is a source of bad health. City ordinances should always specify that the manure should be kept in boxes which are fly proof and that the manure boxes should be emptied at weekly intervals. There is no basis for the legend that the odor of horses and hogs is healthy. Another and similar legend is that the odor of goats is healthy. There is no truth in any of these.

Malaria Easy to Cure.—*Mrs. B. P. writes: "We now know, I believe, where malarial fever comes from, but I wish to ask if there is any cure for it. Can the fever ever be entirely eradicated and if so by what means? Will medicine, antitoxin injection, diet or climate affect the disease when it has a hold? Will life out of doors help it?"*

Reply.—Generally speaking, malaria is the most curable of all diseases. Unless the patient is being reinfected by mosquitoes, the disease clears up spontaneously. A few doses of quinin given while the parasite is in the growing stage and repeated for three days are generally all that is necessary, if mosquitoes are barred out.

Occasionally, as Craig of the army has shown, malarial organisms get in the spleen and bone marrow and lie latent for some time. Iron, arsenic, and quinin nearly always suffice for these.

Ninety-nine per cent of the people who think they have intractable, recurring malaria have no malaria at all; they have something else.

Daily Allowance of Quinin.—*D. B. B. writes: "In taking quinin to cure malaria, how large a dose should be taken at a time and at what intervals? From what part of the body is it best to take a sample of blood for a microscopic examination for malarial germs? When a chill is not evident, what are the symptoms of malaria? Would a severe headache about the same time each week indicate malaria in one who has been infected for about three years but had no chill in the last year? Is the taking of large quantities of quinin injurious to any organ of the body? How would it affect a leaky heart?"*

REPLY.—1. Thirty grains a day. If the condition is urgent it can be given in one dose. The usual plan is to give it in five-grain doses. Some give the thirty grains in eight hours, some distribute it over the twenty-four hours.

2. It makes no difference in an ordinary case. The finger is frequently used. The lobe of the ear is preferred by many.

3. In a marked infection, fever and aching, followed by a sweat. But the variations from this type are many. The microscopic test is practically always available.

4. It would be ground enough to warrant repeated blood examinations and the therapeutic test—trial of quinin.

5. No.

6. Not at all.

Effect of Quinin.—*J. O. T. writes: "Is quinin a mineral or a vegetable? A party claims that quinin is bad for the health, as it is a mineral. I have always been under the impression that it came from Peruvian bark."*

REPLY.—You are right. Quinin is derived from Peruvian bark and it is, therefore, a vegetable substance. Quinin is a poison. If you are infested with malarial organisms, take quinin. It will poison you somewhat, but it will kill the malarial organisms. If you have not malaria, do not poison yourself with quinin.

Mosquitoes.—*H. J. H. writes: "In your article on malaria you quote Ruge, who says the race of mosquitoes is kept alive by adults that get into warm places and live through the winter. If this is true where do the countless millions of them come from in the arctic regions? They swarm in clouds over every northern swamp, where the temperature is 50 to 75 below zero and no warm places for them to live."*

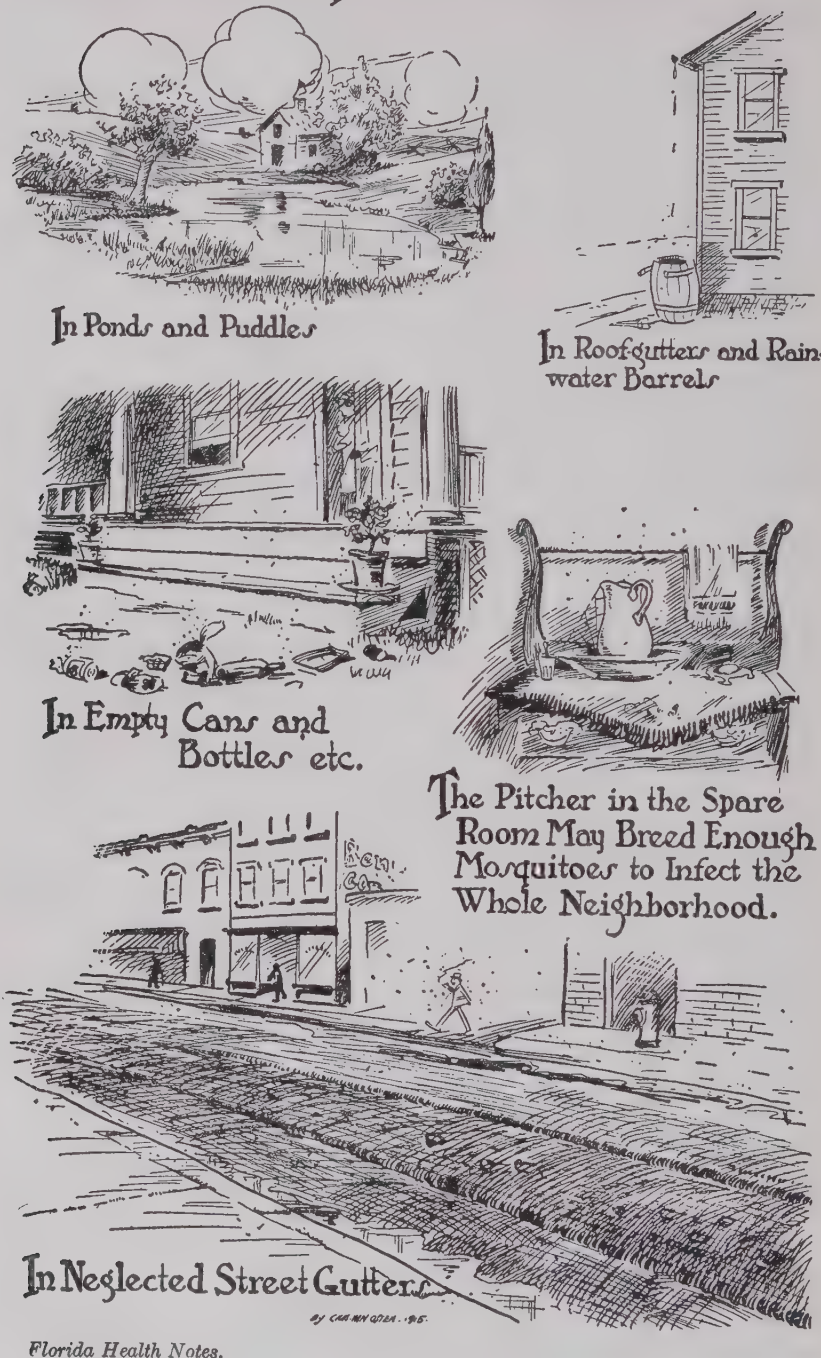
REPLY.—There are warm places even in the arctics. Within a short while after the warm weather of the spring comes on the surviving females begin laying. Multiplication is very rapid. The marsh mosquito eggs can live through the winter in mud and hatch in the spring. Whether the eggs of other species can or not is unknown. A few larvae survive. The important method of winter survival is by hibernation in warm places.

Mosquitoes from Cisterns.—*J. H. F. writes from Joliet: "In your catalog of breeding places for the mosquito you overlooked the cistern. So far as cities and villages go cisterns are the breeding ground of mosquitoes. Where cisterns are in basements it is difficult to shut the mosquito out, unless it is done at the time of construction."*

REPLY.—There are anopheles mosquitoes in Joliet, but they are not infected with malaria.

Malaria in Lexington.—*Anxious Mother asks: "Is there much malaria around Lexington? We drink water from a well; is it safe?"*

REPLY.—The malaria rate in the district you mention is not high, and it is getting less year by year. Where water is from wells, the question as to safety must be answered for each well. Probably the Kentucky Board of Health can advise you as to the safety of the well to be used.


Where Mosquitoes Breed—
In Ponds and Puddles
In Roof-gutters and Rain-water Barrels
In Empty Cans and Bottles etc.
The Pitcher in the Spare Room May Breed Enough Mosquitoes to Infect the Whole Neighborhood.
In Neglected Street Gutters

Florida Health Notes.

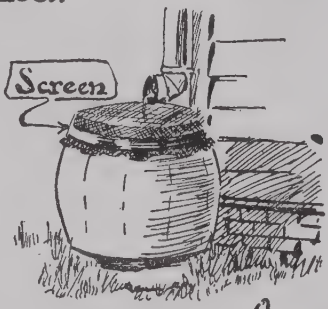
FIG. 128.

—and How to Prevent Them.

Stock Permanent Ponds With Fish.

Drain or Fill All Low Spots Where Stagnant Water May Collect.

When You Can't Drain, Oil.



Do Not Allow Stagnant Water to Collect Anywhere on Your Premises.

Florida Health Notes.

FIG. 129.

To be protected against malaria, be careful of mosquitoes, particularly of mosquitoes that breed and live around the house. Keep away from people who have malaria, or who have had it within a year.

The disease cannot pass directly from such a person to you, but the mosquitoes around such a person will be a menace to you.

ANTHRAX

One of the first bacteria discovered was that of anthrax. The reason is that it is so large that it can be readily seen with low power imperfect microscopes—the only kind the pioneers in bacteriology possessed.

The disease is frequent in cows and horses. It is infrequent in man.

Human anthrax is of several varieties. In most cases the bacillus gets into the tissues through some wound in the skin. For some reason, probably because of its large size, it is held near the point where it got in.

In over half of all the cases the anthrax carbuncle is on the face. In 38 per cent. of the cases the infection is on the hands or arms. About two days after the exposure the carbuncle starts as a small red itching point which feels and appears like an insect bite. In less than a day the small pimple is a small blister and within another day it is a fiery carbuncle.

There is no way to tell this carbuncle from an ordinary carbuncle except to examine for anthrax bacilli under the microscope. This form of anthrax is not a very violent disease. Two-thirds of the cases get well.

Perhaps some cases of anthrax carbuncle are diagnosed as ordinary carbuncle. Unless the sick man happened to be a dairyman or hostler, shepherd, butcher, tanner, wool sorter, or rag picker it would not occur to the physician in most cases to examine the secretion of the carbuncle under the microscope.

In Europe the peasants have internal anthrax. Perhaps it comes from eating pickled meat from animals that have died of anthrax. Edwards says that in Saxony in one year there were 206 cases of internal anthrax.

The disease starts with a sharp rise in temperature. The fever is high. There is vomiting of blood. Blood is passed in the stools. Carbuncles of the skin may appear. If the physician gets suspicious and examines the stools for bacilli he discovers the disease, otherwise not.

ANTHRAX OF THE LUNGS

Wool sorters and rag pickers sometimes inhale dust containing anthrax bacilli. As the bacillus is large it is caught in the small blood vessels of the lungs. The patient has a high fever and cough. His sputum contains blood. He is liable to die on the second or third day. About the only way to diagnose the disease is to find anthrax bacilli in the sputum.

ANTHRAX IN THE BLOOD

Sometimes the bacillus, in spite of its size, gets into the blood stream. When it does it finds itself at home. It multiplies rapidly. Many of them

lodge in the tissues but in spite of this they can be found in numbers in the blood stream. The disease is rapidly fatal.

The patient has a chill, followed by high fever and great exhaustion. The spleen may be large, especially if the patient lives a few days. The urine contains blood, albumin and anthrax bacilli. This is the form in which anthrax usually appears in the lower animals.

Since the disease is not natural in man it takes on the atypical form—the carbuncle rather than the typical form—of blood infection when it appears in the human subject.

Anthrax as a disease of human beings has never been, is not, and probably will never be a disease of first importance. The ordinary man engaged in the ordinary work of society is in practically no danger from it. Men who work in hides, hair, and wool need to be protected against it. In some instances that which they work in can be sterilized. To protect against dust the hides, wool, or rags should be sprinkled. Some wool sorters and rag pickers can be persuaded to wear respirators when at work.

ANTHRAX AND FURS

A short time ago a girl in New York died from anthrax. The carbuncles in this case were on the neck and the girl had recently worn a new fur collar. Since it was not possible to find any other way in which the girl could have contracted the disease the suggestion was made that the fur collar carried anthrax to the girl. The health authorities investigated the case as well as they could. They came to the conclusion that the fur collar was not responsible. They found that furs are so carefully cleaned that any anthrax bacilli there would be cleaned out. Furthermore, they found that there was no record in medical literature of a case of anthrax in workers in fur.

Anthrax is due to a very large spore-bearing bacillus. The spore-bearing bacilli are hard to kill. When anthrax once infects a pasture or a barn it is exceedingly hard to get rid of it.

A certain dairy district in northern Illinois had a small amount of anthrax infection which hung on for nearly ten years. About once in two years a few cows would be found infected. The cows would be killed and their bodies burned, whereupon the disease would disappear and no evidence of it could be found for a year or two. The bacilli either lay dormant as nonactive spores, probably in the soil of the pastures, or else they lived an active life in some unknown host.

Anthrax bacilli have been known to keep alive in hides which have been thrown about, beaten, shipped long distances over land and sea and subjected to all sorts of climatic influences.

The authorities found no account of fur-borne anthrax in medical literature. How much is that point worth? Anthrax in the human subject is a rare disease. The number of cases on record is small. When a case was recorded in the health department recently the newspapers said it was the first case on record in Chicago. While this statement was incorrect it indicates that the disease is very rare. Few physicians know anthrax. If the average physician were to see a case the probability is that he would fail to diagnose it.

Anthrax carbuncle looks like ordinary carbuncle. A suspicious carbuncle in a tanner or wool sorter might cause a bacteriologic examination for anthrax. A carbuncle in a person who wore furs would not occasion suspicion. All in all, the fact that there are no cases of anthrax in fur workers on record does not prove that there were no cases.

Considering these several points, the negative finding of the authorities does not convince us that fur might not have been the means of infection. But there is no reason for women to discontinue wearing furs. Even if this case was so infected the fact is that the danger is so slight as to be negligible.

PLAGUE

"THE PRESENT PANDEMIC OF PLAGUE"

Such is the title of a report written by Dr. J. M. Eager in 1908 and issued by the Public Health and Marine Hospital Service at a time when the disease threatened to spread from California to the remainder of the United States.

There are two perennial foci of plague—places where the plague seed stays and from which, from time to time, epidemics travel out over the world. One of these is in western Asia. This is the more violent strain, but it has less tendency to break out over the world than its kinsman. It is from the other strain—that whose home is Yunan, China—that the present epidemic began to spread in 1894.

In 1894 plague got out of its home ground and traveled from Canton to Hongkong. By 1896 it had reached Bombay and there it found two conditions making for its growth and spread. The caste and religious prejudices of the people prevented proper sanitary measures of control and thus the plague got a good foothold. The steamship connections at Bombay then opened up new possibilities for spreading it over the world.

Eager says that by 1900 plague was present in every quarter of the world—Europe, Asia, Africa, Oceania, North and South America—a pandemic, or, in other words, a world wide epidemic. Since that time it has been beaten back in this place and that while hither and yonder it has pushed forward.

The more civilized countries into which it has been imported have driven it out only to find that in some careless land it has been gaining headway, and is ever ready to push back into the forbidden country.

For instance, it reached California in 1900 and flourished for three years; then it became invisible and so stayed for four years; then it flared up for two years, spread up and down the coast from Los Angeles to Seattle, then vanished and seemed willing to give the San Francisco exposition a fair chance. It quit the attack on the Pacific seaboard and swung around into the Gulf of Mexico and having got a foothold in Cuba and Porto Rico it has again threatened us this time from the East.

While it seems to yearn for a chance to get at white people it does not make any headway when it gets among them, and is rather easily dislodged. It is most destructive among the yellow people, the Chinese, and brown

people, the East Indians. In the last sixteen years 7,500,000 East Indians have lost their lives from it. In one province 1 per cent of the total population died from it in ten years. In Canton between March and August, 1894, it killed 120,000 people.

Its history on the California coast is most interesting. In January, 1900, plague was discovered in San Francisco by Surgeon J. J. Kinyoun of the Public Health and Marine Hospital Service. The existence of the disease was denied by certain business interests. Pressure was brought to bear on the governor who, in turn, proclaimed that there was no plague in San Francisco.

The national authorities stood their ground. As the plague was wholly among the Chinese and this race habitually herds to itself the bureau's orders governing interstate quarantine and supervision were made to apply only to Chinese.

There seemed to be no use in supervising the coming and going of white people as none of them had been found sick with the disease. The chance to draw an easy line between the safe and the unsafe appealed to the common sense of the men in the service.

However, somebody saw a chance to take advantage of a technicality and the Chinese Six Companies were persuaded to ask for an injunction from Judge Morrow.

The judge heard no testimony as to whether plague was present or not. He granted the injunction on two grounds: First, the regulations discriminated against the Chinese; second, there was no plague in San Francisco.

Twenty-eight Chinese died of plague in San Francisco in 1900.

By June the powerful politico-business combination had reached the national government, and the Public Health and Marine Hospital Service was ordered to stop its activities. Officially there was no plague.

The people of the United States, however, and particularly of Idaho, Washington, Oregon, Nevada, and southern California, would not be fooled. They refused to trade with San Francisco. They did not care to buy carpets there and have plague thrown in for good measure—what they call lagniappe in New Orleans.

By 1901 the politico-business combination had begun to yell like a whipped cur. In that year twenty-five Chinese died of plague in San Francisco. In January, 1901, Secretary Gage of the treasury appointed a commission to investigate the plague in San Francisco. The three commissioners were from the universities of Pennsylvania, Michigan, and Chicago. The railroads and the Chinese Six Companies, forgetting the injunction granted them by Judge Morrow, coöperated with the commission.

The commission carefully investigated six dead Chinamen and found plague beyond question. Among other conclusions was one that Wing Chut King had died at 1001 Dupont Street on March 6, 1900, of plague and, inferentially, the learned judge was wrong. Dupont Street at this number is on what is called the Barbary coast.

Is it any wonder that a political revolution came about in California, that the politico-business combination was thrown in the discard, that the recall was passed, that women were given the ballot and that the people demanded the recall of decisions?

The California legislature in 1900 appropriated and the state board of health spent unavailingly $50,000 in trying to control plague. In 1902 there were 41 fatal cases in San Francisco's Chinatown. In February, 1903, the national, state, and municipal governments began a joint campaign against plague in Chinatown. For eighteen months they spent monthly sums as follows: United States, $1,600; state, $1,500; city, $2,500. There is no way of knowing what was spent by property owners.

By July, 1904, the disease was cleared out of Chinatown. There were 17 deaths in 1903 and 8 in 1904. For three years there was no case of human plague but it is quite certain that the disease was kept alive among rats. In June, 1907, a sailor on a harbor tug plying San Francisco bay was found to have plague.

It has been suggested that the earthquake and fire in 1906 had driven infected rats into closer association with men and thus the disease was brought back to the human family. In 1907 and 1908 there were 159 cases and 77 deaths, all among white people. The Chinaman had learned his lesson. Chinatown had been rebuilt.

Since 1900 United States supervision and coöperation have been welcomed. Between 1907 and 1911 the national government spent $900,000 in plague work in California, and the state and municipal governments an aggregate of many hundreds of thousands in addition.

Surgeon General Blue writes me that in the four years, 1907 to 1911, the people spent $2,000,000 in rat-proofing. All these millions to do what a few thousand dollars would have done had the people stood behind Kinyoun in 1900.

Let me wander enough to emphasize the following: Because he did his duty and tried to protect them, the business-political combination in California drove Kinyoun, a brave, heroic public servant, not only out of California but out of the Public Health and Marine Hospital Service. When Carnegie medals for heroism are being distributed, one should go to Joe Kinyoun. It should go to him on the motion of Lyman J. Gage, because he knows where the pressure came from, and be seconded by ex-Governor Gage of California, who exerted a part of it.

For several years neither infected people nor infected rats have been found in San Francisco or on its peninsula. But in August, 1903, a blacksmith from across the bay spent a day shooting ground squirrels near his home. Two weeks later he had the plague.

During the next five years case after case developed amongst people who had been shooting ground squirrels; so that although no plague now exists on the Pacific slope among the people or the rats it is more than possible that here and there it is being kept alive by the small animals of the fields.

It is recognized now that plague is a disease of rats as well as of human beings. Therefore, when a people is threatened with plague it must take thought of its rats. Sick rats are harder to watch than sick people. Therefore, when plague threatens rats are nearly as important as people.

However, rats are never unimportant. They are enormously destructive. They cost enough to make them burdensome without regard to the danger from them. They spread some disease other than plague. They are nasty as well as destructive. They haul garbage and meat into out of the way

places there to rot, offend, and become a source of nuisance. There is no redeeming word to be said for a rat. Human affections have been bestowed, and often wasted, on everything from trained fleas to elephants, but who ever loved a rat?

The common rat of this country is the brown rat, the roof rat not being of much consequence. These, our usual rats, can harbor plague but if the disease comes to us, it will probably be brought into the country by the black rat—the usual ship and harbor rat.

The black rat, as compared with the brown rat, is smaller, more lithe, and more active, It has longer legs, longer ears, a longer, more pointed nose, and is darker in color.

A female rat has about ten to a litter and bears four litters a year. No rat census of the United States, or any part thereof, has ever been taken, but we can get some idea of their abundance from a report that on a 2,000 acre estate in England they caught 37,000 rats and Lantz says: "Even then the property was by no means free from rats."

Once, in time of famine in India, when food counted, rewards were offered for rats, and 12,000,000 were brought in. The rat population of any city is probably greater than the human population.

Lantz, in an interesting bulletin, "The Rat in Its Relation to the Public Health" (Public Health and Marine Hospital Service, 1910), tells of some interesting rat migrations.

In 1903 there was a rat migration in Rock Island and Mercer counties, Illinois. The Moline *Evening Mail* said that F. W. Montgomery of Preemption killed 3,435 rats on his farm between March 20 and April 20, 1894. In 1877 there was a similar migration in Saline and Lafayette counties in Missouri and in 1904, another in the Kansas River Valley.

Rats do not migrate unless there is a reason and not infrequently the reason is the existence among them of an epidemic disease. Therefore, whenever rats are to be seen in the daytime, whenever they get out on the street or on the road, whenever they appear in large numbers or in unwonted places, whenever dead rats are found in unusual abundance, whenever the newspapers or the neighbors note a plague of rats, it is wise to take notice and to inaugurate an investigation.

California has proved that the ostrich policy does not pay. A rat migration may have health significance.

Lantz says: "The ferocity of rats has been grossly exaggerated. The stories of their attacks upon human beings, sleeping infants especially, have but slight foundation. Ordinarily, the probability of being bitten by rats is remote, and the bite is not poisonous," which is true.

I have been in the stockyards and around slaughtering houses after midnight and have seen hordes of enormous rats, but I have never seen them disposed to fight. I have known children to be bitten by sick rats, not plague-infected rats, but rats otherwise sick. I think when a rat viciously attacks a man there is a fairly good chance that the rat is sick, at least it is suggestive enough to demand investigation. Viciousness in rats may have an epidemiological significance.

In an epidemic of plague in people it is the rule that rats, dead or sick of the plague, are frequently found. Sometimes the finding of a plague-

stricken rat is the means of establishing a diagnosis of the disease in the human subject since often those who have it cover it up and sometimes the attending physician does not recognize this, to him, strange condition of his patient.

Sometimes a first case having been found in a human being and a crusade against rats having been started, the disease has been found widely spread among rats. Rats seldom bite people or any article that any person is subsequently to eat. The chances of sick people directly infecting rats is slight. All of which suggests that there is needed some agent to bridge over the space between rats and people.

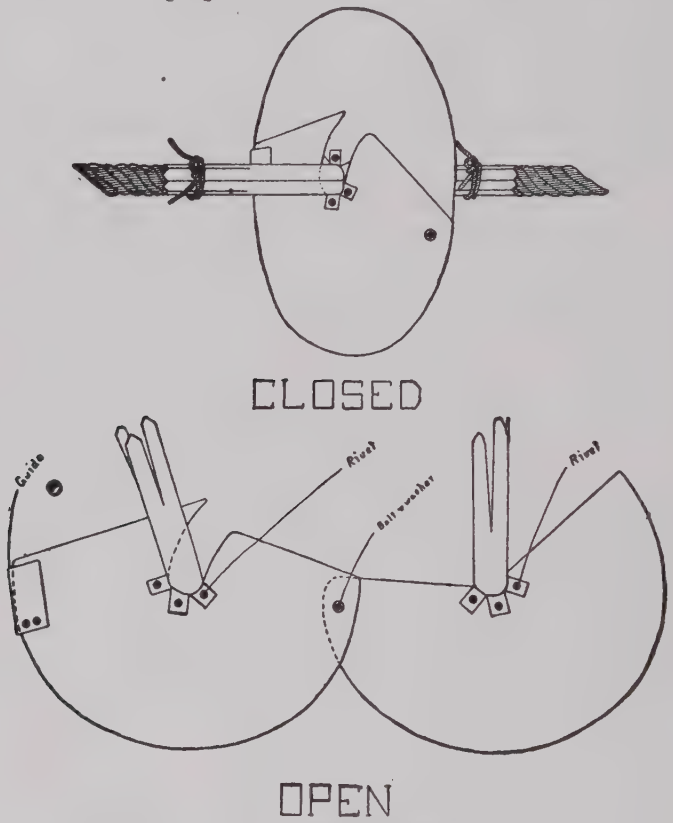


FIG. 130.—RAT GUARD FOR A SHIP'S CABLES.

The flea is the agent that binds them together. Rat fleas carry the bacillus of plague back and forth between rats and men by sucking the bacteria into their stomachs along with the blood. The India Plague Commission found that plague bacilli remained alive in fleas for fifteen days.

DISEASES OF RATS

As Rucker says: "Plague is primarily a disease of rodents and, secondarily and accidentally, a disease of man." He puts it in doggerel as follows:

"First plague in rats, and then in fleas,
Then plague in man and quick disease.
No rats, no fleas, no plague disease."

Our present day interest in rats is because plague is epidemic in Porto Rico and Cuba, and from those footholds is menacing us.

Through the Panama Canal the pest holes on the north part of the west coast and some of the north coast of South America are within menacing distance of our gulf and Atlantic ports, and plague can jump as far as a freight car or ship can haul a rat in two weeks.

But we must not lose sight of the fact that rats have other diseases some of which human beings also have.

Probably the first nation to take an interest in rats was Denmark and the larger part of their interest was due to the rat as a spreader of trichina. Trichinosis is abundant among rats. Stiles says: "Trichinosis will probably never be eradicated from man until rats and mice are practically eradicated, and any public health campaign against trichinosis must take the rat into serious consideration."

Rats have eleven kinds of internal parasites which also infect men. Among these are tapeworms. The dwarf tapeworm of man is similar to a dwarf tapeworm found in rats.

They also have fleas, lice, and mites. The flea carries the plague from rats to men and from men to rats. Plague bacilli have also been found in rat lice.

Rats have pneumonia, Bright's disease, drunkard's liver, stone in the bladder and many other diseases that man arrogates to himself.

They have many different kinds of tumors, including every sort of cancer. In fact, the most promising experimental work now being done looking toward a cure for cancer is that on cancer in rats and mice. Cancer in rats and mice sometimes runs in epidemics. With it they can be inoculated; they can be cured; the sera from cured cases will cure the disease in other animals. And now experimenters are trying to find a way to apply this information, and possibly even these sera, to the cure of cancer in the human subject.

Rats have leprosy, and it is hoped studies of rat leprosy may help in working out better cures for human leprosy.

Rats also have a rather queer disease known as rat-bite disease. Most of the reported cases of this disease have come from Japan. Most of the cases reported from this country have come from the Mississippi Valley. Stiles suggests that rats may be a factor in the spread of sleeping sickness—a disease due to a wavy blood parasite known as trypanosoma. These cases were observed before a certain kind of blood parasite had been discovered. Probably a parasite of this type is responsible for rat-bite disease.

PLAGUE AND THE CANAL

Recently Dr. Howard King of the Tulane University School of Tropical Medicine, taking as his text an old Spanish proverb, "He is in safe quarters who sounds the alarm," told the people of New Orleans and the

Mississippi Valley generally of some of the disadvantages of the Panama Canal.

Within a few years traffic will be pouring through the canal—many of the ships manned by celestials. Much of the traffic will come into New Orleans. The most efficient health organization in the world—that of the Canal Zone—will have been dissipated. Places now weeks removed from the United States will be close at hand, right on the arteries of commerce.

This axiom is everywhere accepted—"Disease follows trade." Certain diseases are best carried by passengers, others by freight; some by railroads, others by steamships.

Sailors are proverbially indifferent to rats. Some are superstitious about sailing on a rat-free ship. Therefore, plague is frequently a ship-borne disease.

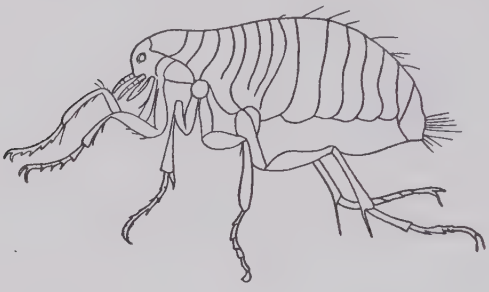


FIG. 131.—THE HUMAN FLEA.

Dr. King's alarm is based upon the fact that the canal is going to put us in close touch with some careless people. In neither Colombia, Ecuador, Peru, nor Chile does there exist a properly constituted board of health. There is no trustworthy recording of deaths. The authorities have neither the power nor the knowledge to prevent the spread of disease among themselves or those who trade with them. The people are both ignorant and indifferent. For example, he says, in Guayaquil the inhabitants are inclined to rejoice in yellow fever because it scares foreigners away.

President Castro of Venezuela once declared La Guayra a healthy port open to commerce while plague was raging citywide. The order was annulled because of the trouble the German minister made about it. La Guayra and Guayaquil are within three days' sail of the canal—and plague is not easily recognized nor easily controlled. Let us not forget that a man died a while ago in the government hospital in Colon from unrecognized plague. If that medical corps fell down anybody will and you and I should base our positions on things as they are.

Dr. King made two specific recommendations—that the United States Public Health and Marine Hospital Service organize the health forces of the west and northwest coasts of South America and that New Orleans be cleaned up.

The newspapers recently contained telegrams saying Ecuador had asked Gorgas to clean up Guayaquil.

From a New Orleans newspaper recently I learn that Dr. Dowling is winning his fight in New Orleans—the French market is to be screened and made more sanitary.

The leaven is working.

The changed conditions in California will make San Francisco the safest place, as regards plagues, in the United States.

SPREAD OF PLAGUE

It is rather easy to watch and to isolate plague-afflicted people, but plague in rats is a difficult proposition. Therefore plague is a jumping disease. It jumps from town to town, over others to another.

A small boy playing near the Southern Pacific freight yards in Los Angeles was bitten by a ground squirrel. He became sick, had buboes, was feverish. His physician called for several days but was still puzzled over a diagnosis, when he asked Dr. Powers to help. Dr. Powers, who had seen plague, inquired if the boy had been around rats. No, but he had caught a sick squirrel. Presto! the boy had plague. Los Angeles was infected. A freight car had brought an infected rodent from San Francisco—a long jump, but one easily understood in the light of the yard full of empty grain cars near by.

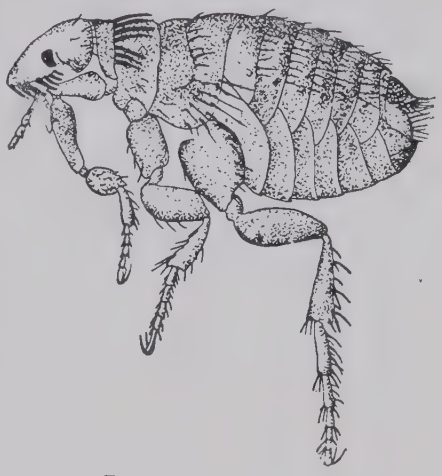


Fig. 132.—Dog Flea.

The moral is—to prevent plague from getting a foothold in a community two things are necessary: rats must be watched, and the people, especially the doctors, must know the disease when they see it.

The three kinds of plague are bubonic, septicemic, and pneumonic. In the bubonic type the lymph glands, and particularly those in the groin, filter the bacteria out of the lymph, keeping most of them from getting into the blood.

In the septicemic form the bacteria get right into the blood stream and the groin glands, not being choked with them, do not swell up; in other words, do not make buboes.

In the pneumonic form the bacteria are carried into the lungs by the air and cause pneumonia.

In a given epidemic the type of the disease is either pneumonic or bubonic, the septicemic cases being modifications of the bubonic type.

The bubonic form starts with a chill, followed by a fever, which may go as high as 108°. About this time the glands begin to swell. Generally the swelling is limited to one group of glands. This group is the one which serves as a filter for that part of the body through which the infection entered. There is nausea, vomiting, aching, and profound prostration. Later there is stupor, delirium, and unconsciousness. The glands may break down, may suppurate. There may be hemorrhage from the nose or from any mucous membrane. There may be small hemorrhages under the skin.

Any physician who reads this description will recall cases of infection—so called blood poisoning—in which there was just this train of symptoms. If the pared corn or the needle prick had been overlooked the case might have easily been called plague.

It takes a good deal of mental alertness and usually a bacterial examination to decide whether a bubonic fever is due to pus germs or plague bacillus. There are cases of blood poisoning where the cocci get past the glands and into the blood stream. If in these cases the cut toe or finger is overlooked alertness and judgment are required to decide whether the germ in the blood is a streptococcus or a plague bacterium.

The first requirement of plague prevention is that physicians be able to know the disease when they see it.

THE COST OF RATS

Lantz of the national agricultural department wrote one of the articles in the government bulletin on "Rats." His article is on "The Rat as an Economic Factor," and he ends it with the statement, "The keeping of rats is exceedingly expensive."

Did you ever think of yourself as a ratkeeper?

Lantz estimates that it costs $1 a year to keep a rat in a city. A farmer can keep one for about 60 cents. The farmers within 500 miles of Chicago keep about one rat to each acre. These figures give the cost for plain feeding. Fancy-fed rats are more expensive. A silk-eating, or a picture-chewing, or a shoe-cutting rat costs more to maintain.

An Iowa farmer wrote the Missouri Valley Farmer *that the rats in his three bins destroyed more than enough corn to pay taxes on* 400 *acres of land.*

Lantz quotes a newspaper correspondent as writing: "Rats destroyed enough grain and poultry on this place this season to pay our taxes for three years."

A Washington commission merchant stored one hundred dozen eggs in a tub. When he went for them he found the rats had gnawed through the bottom and made a clean getaway with over seventy-one dozen.

Lantz thinks rats are worse chicken catchers than skunks or minks.

To the cost of feeding the rats are added fire loss, damage to property from gnawing and breaking and the indirect loss due to the expense of rat catchers and rat-proofing.

The total cost per inhabitant for city people is $1.27 *per year per rat. In other words, Chicago's rat bill is something over* $3,000,000 *a year; that of the United States,* $35,000,000.

In rat killing the author places traps first, poisons second, dogs third, skunks fourth and cats a bad fifth. An alley cat in a city is worth while, but a kitchen fed cat is useless. While rat-catching dogs, rat traps, rat poisons, covered garbage cans, and other anti-rat procedures help a little, no plan of rat eradication makes much headway except rat-proofing or a part of it. Rat-proofing means cement construction. A man who will rat-proof his buildings and then keep a few rat dogs around will not be greatly annoyed by rats. Any man in a city can keep the rat population off his premises in this way.

But eradicating rats from a city is a different matter. In San Francisco the United States has spent several hundred thousand dollars for rat catching since 1907 and the citizens have spent more than $2,000,000 in rat-proofing. A good day's rat catch is not a fifth of the 1907 figures; still San Francisco is not rat-proof nor rat-free.

Dr. Heiser says Manila, in 1900 to 1905, paid $15,000 in rat bounties and $325,000 in other rat-catching expense without decreasing the number of rats.

The way they succeeded in getting rid of bubonic plague was to catch a few rats in each part of town, examine them for bubonic plague—a rat-sampling process, if you please—and then draw circles around the places where plague-infected rats were found. They then began rat extermination and rat-proofing at the periphery and worked toward the middle.

Symptoms of Bubonic Plague.—*G. V. H. writes: "Kindly tell me the symptoms of bubonic plague."*

REPLY.—The symptoms of bubonic plague usually follow one or two types, the bubonic or the septicemic. In the first, the attack starts with a chill and the fever rapidly rises to somewhere between 104° and 108°. Prostration is extreme—the lymph glands swell, usually beginning with a swelling of the groin glands. Sometimes the buboes form abscesses; usually they do not. In the septicemic form there are chills, fever, prostration, unconsciousness, but no glandular enlargement. The most violent of all the forms is the pneumonic, where the disease manifests itself as a rapidly fatal pneumonia. This was the variety they had in Manchuria two years ago. It is, however, not often found in the strain that is threatening us now through Cuba and Porto Rico. That strain usually furnishes the bubonic type and often the septicemic, but not the pneumonic.

LEPROSY

DANGER OF LEPROSY

Dr. E. L. McEwen analyzed the references to leprosy in the Bible and profane literature on the subject of leprosy in biblical times. The conclusion to which he came was that the term leprosy in biblical times stood for many different skin diseases. Some of them were highly contagious. It may have been that leprosy proper in that day was extremely catching and also deadly, but Dr. McEwen could not find evidence of it.

However, if leprosy was highly contagious two thousand years ago it is not so now. Dr. McCoy, director of the leprosy investigation station in Hawaii, got the history of everybody connected with the leper colony or who had been connected with it for many years back.

The Hawaiian law permits well people to accompany lepers when they go to the colony and to remain with them as long as they wish and then return to society, provided a careful examination shows no leprosy.

Several hundred people whose histories were carefully investigated lived in the colony for months and some of them for years and then went back to society. Some are living with lepers as husband or wife; others live in the same rooms with lepers; others eat at the table with them. The contact is of the closest character and this intimate contact is kept up for years.

The results? One person in twenty-five developed the disease. Then the chance that a person living in a leper colony will escape infection is about twenty-four to one.

There are a moderate number of lepers in the United States. I presume there are one or two in Chicago always.

There is practically no danger that the people who incidentally meet lepers on the street, in the stores, in restaurants, or on the cars will contract the disease.

There is about one chance in twenty-five for the people living in the same house with a leper to contract the disease.

This degree of danger is great enough to make it advisable to care for lepers in leper colonies, but it is not great enough to warrant the average man on the street to have any fear of lepers or leprosy confined or at large.

Leprosy is a disappearing disease. That which has made it a disappearing disease is the policy of caring for lepers in colonies.

Causes of Leprosy.—*J. F. B. R. asks: "1. Can you tell me if there is any way to prevent leprosy?*

"2. Has the germ that causes leprosy been discovered?

"3. Is there any way, as, for instance, by the injection of a serum into the human body, to make it immune from leprosy? I have been thinking that as there is an antitoxin for diphtheria there might possibly be some preventive for leprosy.

"4. Can you tell me, is there now being made, or has there ever been a systematic study made, of leprosy?

"5. What has been done, and what is now being done to fight it?"

REPLY.—1. Yes, by keeping away from those having the disease. The disease is very mild. It is not easily transmitted. It is not contagious. There is very little danger of contracting it except by prolonged contact with a leper.

2. Yes.

3. No.

4. The disease is being thoroughly studied in Europe, in the Philippines, in Havana, and in a few places in this country. The investigators are about convinced that they have worked out a solution. It is too early to talk much about it.

5. Several states have isolated their cases of leprosy. A few cities have done likewise. The national government is in control of several colonies. It is the general belief that the disease is losing ground.

HYDROPHOBIA

DOG DAYS

Summer is the season of the year when the mosquitoes are trying, the flies are annoying, the snakes are most menacing, and our fear of dogs is the greatest. The season is known as "dog days," and the reason for the name is that for some strange reason dogs are supposed to be in especial danger of going mad. If mad dogs were found to be especially abundant in July and August it would be a good reason to call March and April the dog days, since about that much time is needed for hydrophobia to develop.

But there are no dog days. The sun, the summer solstice, the July moon, the torrid heat, the high humidity—none of these has anything to do with hydrophobia. January is just as much dog days as July.

Hydrophobia is a disease of dogs. It can be spread to men, cats, skunks, cows, mules—in fact, almost all animals. But it is not of importance except in two of them—men and dogs. A campaign against hydrophobia need not take in anything except man and dogs; men because their protection is our problem and dogs because they create the hydrophobia problem.

The disease is due to an infection. The infection locates in the brain. The infecting virus is excreted by the saliva. *The virus travels slowly from the bite up the nerves to the brain. The journey takes time, more than is required for any other germ. It may take three weeks, it may take three months, and it may take several times three months.*

We have no laboratory test for hydrophobia that can be applied in a living animal, be it man or dog. The veterinarian or the doctor can watch the symptom and conclude usually whether the disease is hydrophobia or not but he cannot get any help from the laboratory until after the sick one has died. The laboratory worker can then take the brain and if he finds negri bodies in it can say positively that hydrophobia was present.

This is not so important as it seems on first blush. It is nearly always possible to tell from the symptoms. It is easy so to keep a dog and very easy so to keep a man that he is not dangerous to the attendants and if the head is sent to the laboratory in every case they will clear up the few doubtful cases in ample time to protect all of those who were bitten. From the standpoint of treatment it makes no difference. There is no treatment for hydrophobia after the disease has developed. After the symptoms have started and the disease is clearly developed, there is nothing to do with an affected man except to take him to a hospital and then have him cared for—have his symptoms treated as they arise. In that event the disease is not being treated. The treatment is of the symptoms.

HYDROPHOBIA PREVENTION

The Conference of State Health Officers has adopted the following as a standard plan to prevent hydrophobia:

1. Destruction of ownerless dogs. Dr. Stimson of the Public Health Service thinks this the most effectual single measure. By an ownerless dog is meant a dog without a collar and license tag for the current year. This necessitates a dog-catching department and a pound. Dogs should not be sold from the pound.

2. A license fee for dogs. In cities the tag should be attached by the license officer who files a report describing the dog and its appearance as to health. The license system (a) makes it easy to locate ownerless and straying dogs, (b) reduces the number of dogs kept, and restricts the ownership of dogs to those who will give them care. Unspayed females should be licensed at a higher rate than other dogs.

3. Legal responsibility. Owners should be made legally responsible for damage done by their dogs.

4. Public education. The care of dogs as well as the harm done people by infected dogs should be taught.

5. Muzzling. All dogs should be muzzled for six months after each case of hydrophobia in a dog in the district under control. This means that

in country townships in the Mississippi Valley the dogs need not be muzzled all the time. In cities, as six months practically never lapses between cases, the dogs must be muzzled all the time. In either case the season has nothing to do with the case. It is not the history of the weather but the history of the mad dogs around about that determines whether dogs are to be muzzled or not.

6. Restraint of dogs. If there is much of the disease around the country dogs must be kept at home for at least three months after the time of great danger.

7. Leading in leash. Not advised unless the dogs are also muzzled.

8. Compulsory notification. Rabies in lower animals as well as in man should be reported. In the lower animals, in case the diagnosis is certain, the animal should be killed, the head sent to the proper laboratory and the case reported. If the case is suspicious the animal should be safely confined and developments awaited. Animals bitten by rabid animals should be reported. Those of little value should be destroyed. Those of greater value should be held under supervised quarantine for six months. No part of the carcass or hide of a "mad" animal should be used. Kennels and stalls should be disinfected by the authorities.

9. Imported dogs should be held in quarantine until the danger is past. A person bitten by a mad dog should have the wound cleaned, made to ooze and bleed and then cauterized. As soon as possible thereafter the Pasteur vaccine should be given. Mad stones are worse than useless.

Hydrophobia and Milk.—*H. E. V. writes: "Is there any danger in using the milk from a cow that has been bitten by a horse that had hydrophobia? Today is the tenth day. How long before it would be safe to use her milk?"*

REPLY.—No. If the cow should get sick, stop using the milk—not because the milk will convey hydrophobia but because it is the milk of a sick cow.

Dog Bites.—*G. H. writes: "If a person is bitten by a family dog, treated by a physician who says the dog is not mad, ought the person to be treated by the Pasteur method? Ought the dog to be killed? What are the kinds of treatment, where given, and by whom, and how long after a bite does rabies show in the person? Does the law require the person to be treated if all the evidence goes to show the dog is not mad? What shall be done with the dog?"*

REPLY.—The dog should not be killed. He should be taken to a veterinarian for observation. If it turns out that the dog is not mad, nothing need be done. If the dog is dead the body should be taken to a laboratory for microscopic examination and biologic testing—that is, inoculation of a guinea pig. If these show the dog was not mad and the history of the sickness in the dog bears this out, nothing should be done. If the dog was mad, Pasteur treatment should be taken at once—the quicker the better. The disease usually develops within six weeks after the bite. Occasionally it is delayed.

LOCKJAW

The physicians' name for lockjaw (tetanus) has the advantage of not putting too much emphasis on one symptom. As a matter of fact, tetanus runs a day or two before the jaws lock, and in time spasm of other muscles becomes much more prominent than spasm of the muscles of the jaw.

A case of lockjaw starts in with difficulty in swallowing, profuse sweating, and starting at noises, at bright lights, or when struck by the air from a fan. Perhaps before these symptoms came there was a period of headache and general sick feeling, not in any way different from an ordinary headache or the beginning of any one of a score of diseases.

When the disease is fully developed all of the muscles of the body are rigid all of the time. The rigidity gets worse and better, alternatingly, but relaxation is never complete. Convulsions come on, last a few minutes, and pass away, but even when the period of quiet has come the pressure with the hand will show that certain muscles are hard and firm.

The set contraction of the muscles around the mouth give to the face a grin that is characteristic. The muscles of the trunk bow the back. There is some fever.

The tetanus bacillus lives in the intestines of animals, causing them

FIG. 133.—CLINICAL THERMOMETER.

no harm. It has been proved that certain horses are tetanus carriers, just as certain men are typhoid carriers. These horses pollute the soil with tetanus bacilli. The bacilli cannot increase in the presence of oxygen, which means that they cannot increase and secrete in any place which the air can reach.

The wounds most liable to infection with lockjaw are the deep narrow wounds into which manure, or dirt, or powder has been carried. The ideal wound combination for lockjaw is a nail puncture which is made in a horse barn.

The bacillus secretes a poison. Probably there are two drugs in this poison. The poison is absorbed by the nerves, not by the blood or lymph, as is the case with ordinary poisons. It is carried by the nerves to the brain and spinal cord. The symptoms are due to the action of the poison on the cells of the brain and, perhaps, the spinal cord.

If tetanus starts within less than ten days of the wounding the outlook is bad. If it takes more than ten days for the poison to reach the nerve cells and affect them the outlook is good.

The reports that come from the armies of Europe show that about one-half the cases of lockjaw are being cured. One authority reports that in a certain hospital six out of ten cases are being cured. Anders tells us that eleven out of twelve of the slowly developing, mild cases get well.

It is well to bear this in mind, because in lockjaw, cancer, consumption, and other dreaded diseases well meaning people jump to the conclusion that

some remedy used in one case which recovered is therefore a newly discovered panacea capable of curing all cases.

The treatment used in these hospitals is antitoxin into the tissues around the wound; oxygen, peroxid of hydrogen, and air into the wound; antitoxin into the vein; iodized serum and a solution of Epsom salts into the tissues; good nursing and the control of symptoms according to the judgment of the attending physician.

The experiences of this war have taught us several things about wounds. They are:

1. Dirty wounds must be so dressed that they can get air.

2. Every man who has received a dirty wound should have a small dose of antitoxin; twenty to fifty units are enough.

3. Certain horses are tetanus carriers. Attention should be concentrated on these carriers.

4. Tetanus is fairly curable. But before this information will be very helpful it is necessary that the people know the warnings of the disease.

TYPHOID FEVER

Typhoid fever is a preventable disease. This means it can be prevented, not that it is being prevented. The armies have prevented it. The United States Army has had no typhoid for four years. The soldiers are vaccinated against it.

Typhoid fever is due to the typhoid bacillus. The typhoid bacillus is closely allied to the colon bacillus, but there is this important difference between them—the colon bacillus lives in the intestines of many species of animals; the typhoid bacillus lives in the intestines of man only. Nor can it live in the human intestine indefinitely. It abounds there during an attack of typhoid fever. In some cases, during the attack of fever it gets into the gall-bladder and, having secured a hold, remains there almost indefinitely. Such an individual is known as a typhoid carrier.

No animal except man is subject to typhoid fever. The excretions of no animal except man contain typhoid bacilli. Therefore no animal except man pollutes the water and soil with typhoid bacilli.

Furthermore, typhoid bacilli do not live long outside the human body. Polluted water, polluted soil, or polluted milk will be free of typhoid bacilli after about one month. One of the great laws of nature is that forms of life which are capable of rapid multiplication are easily destroyed.

Not all men are subject to typhoid fever. Some have the power to throw off the bacteria without contracting the disease. A small dose of typhoid bacilli will not cause typhoid fever. The laboratory men have worked out just the number of bacilli to an ounce of water required to cause infection with typhoid bacilli. It is easy to see that in man's combat with typhoid fever the bacillus is at a disadvantage. It should be easy for man to win. Then, is there wonder that typhoid is disappearing?

Any man can avoid the disease. He can be vaccinated. That is certain to make him safe. He can take no raw water or raw food. He can refuse to eat with unwashed hands. If he does not care for water that has been heated

he can refuse to drink any polluted water. If he does not care to boil his milk he can drink pasteurized milk. Properly inspected milk is fairly safe.

A community can avoid the disease. It must have its typhoid citizens, carriers as well as sick, properly nursed and cared for. It must have its water supply, milk supply, and food supply protected. It must abolish its fly nuisance. It must vaccinate.

After the bacilli get into the intestines there follows a period of ten days, called the incubation period. What is happening during that time nobody knows. It is something of importance in the course of the disease. The sickness starts gradually and slowly at the end of the incubation period. There is a tired feeling and some aching. The bowels are usually constipated. After about a day of this the patient feels feverish, and if he takes his temperature he finds that he has an elevation of a degree or two—say 100.5. By the next day he is feeling generally more achy, with a higher fever. He sends for the doctor. The doctor takes a half-teaspoonful of blood from the patient's elbow. This is examined in the laboratory. Two days later it is found that typhoid bacilli are growing in the laboratory test tubes. If a blood culture was not made toward the end of the first week, the doctor will take a drop of blood from the finger or ear and send it to the laboratory for a Widal test. A blood culture will usually show the presence of typhoid fever within the first few days of the start. The Widal test will not show it before the end of the first week or ten days.

A positive blood culture means that the patient has typhoid bacilli floating around in his blood. A positive Widal means that the patient has bacilli in him and that he is beginning to make substances and pass them into his blood, substances which knock out typhoid bacilli in several ways. In the meanwhile, the fever is getting higher and the symptoms more characteristic.

It generally takes a week from the time that the fever starts for the diagnosis to be fairly certain. Therefore, in figuring out the source of contagion you must figure back seventeen days—ten days for the incubation period and seven days for the diagnosis period. If the milk is being investigated two more days should be added—the time from the cow to the consumption by the consumer.

During the second week the fever is getting higher day by day. The patient is getting thinner and weaker. He is, however, more comfortable than during the first week. During the third week the fever remains at about the height reached during the second week. The patient is getting progressively weaker and thinner.

If the patient was freely purged during several days at the beginning of his fever and his bowels have been well attended to since, there will be no diarrhea in the average case. If these things have not been properly attended to diarrhea usually gets troublesome in the third week. Early in the disease the lower end of the small intestine becomes swollen in patches. In the second week these patches break down and form ulcers. These ulcers vary in size from that of a pea to more than an inch in diameter. Sometimes these ulcers cause troublesome diarrhea in spite of everything which can be done. But when proper care is used the danger of this is slight. The ulcers sometimes spread from the large intestines and thus increase greatly the chance of diarrhea developing.

During the fourth week the fever gets less day by day. By the end of the fourth week the temperature will be normal for several hours during the day. It is during this week that complications are most liable to occur. *Complications kill more people than typhoid of itself.*

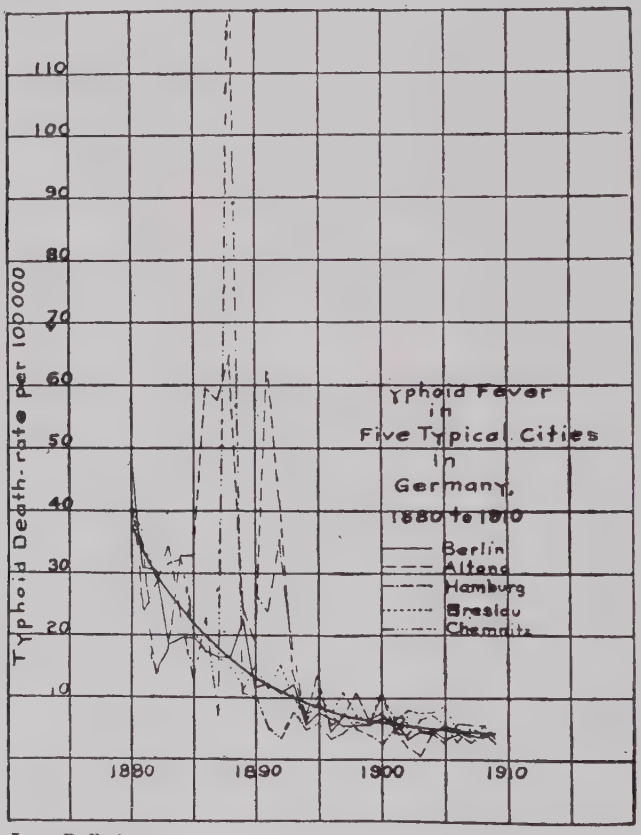
The complications usually met with are:

Secondary infections, particularly pneumonia.

Inflammation of veins, inflammation of glands.

Perforations and secondary peritonitis.

Hemorrhages.

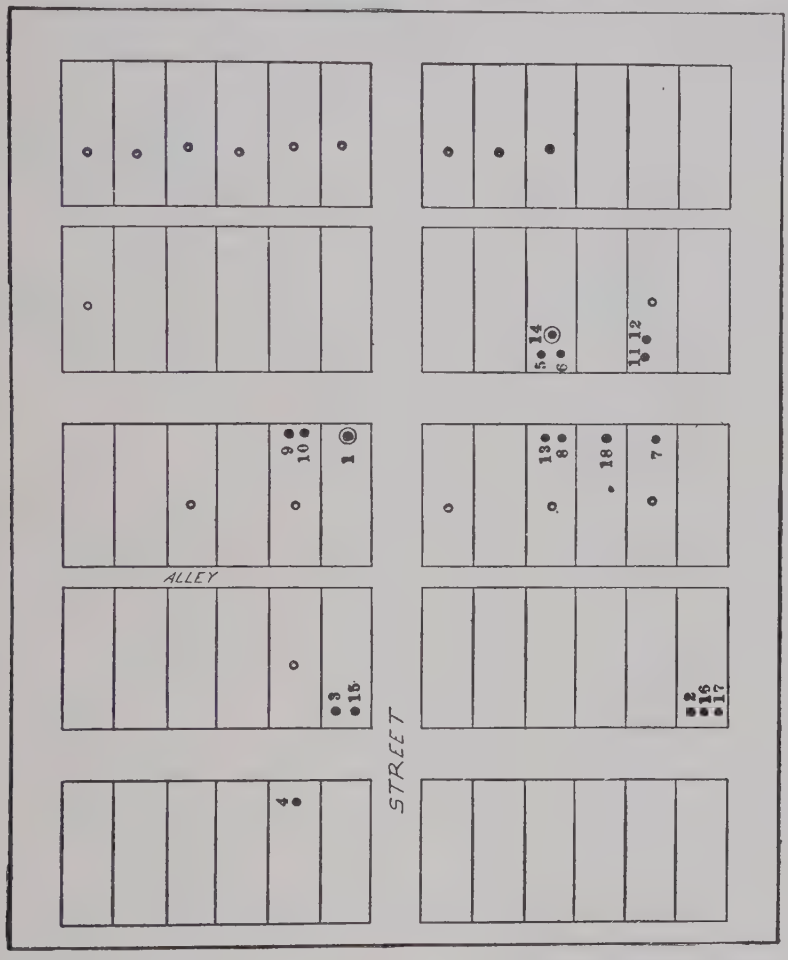


Iowa Bulletin.

FIG. 134.—TYPHOID FEVER DEATH-RATES IN GERMAN CITIES, SHOWING DECREASE IN THE LAST THREE DECADES, DUE LARGELY TO IMPROVED WATER SUPPLIES.

The old-fashioned typhoid with low muttering delirium, great exhaustion, dirty mouth, and flies crawling over the eyes we seldom see at the present time. When the case has been properly cared for by nursing and properly controlled by medical supervision this old-style typhoid state does not develop. This is a partial statement of the nature of a more typical run of typhoid at the present day. It is not so long drawn out nor so exhausting as the typhoid of twenty years ago. The number of cases which cleaning out of the bowels and other good care cut under four or five weeks is getting larger all of the time.

It is a disease in which the patient is influenced by good medical care and good nursing to an unusual degree. *The patient sails a sea in which there are many covered rocks and good piloting is essential.* During the first week it is easy to get the bacteria from the blood. After that it is increasingly



Kansas State Board of Health.

FIG. 135.—THE FLY AS CARRIER OF TYPHOID. Numbers indicate order of cases by date of onset. Cases ●. Deaths ⊙. Wells ○.

difficult. During the first week a Widal reaction is not given. After that and for weeks after recovery the blood will give the Widal test.

What is the meaning of these two facts? The bacteria run unhindered during the first week. By the end of that time the body has developed a pretty good power of hindering the bacilli. This power increases in strength until the body can destroy typhoid germs whenever they get into the blood. This is called immunity. The man is immune to typhoid. Soon after the disease began the sick man started throwing off typhoid bacilli. This is done principally by the kidneys and liver. *The excretions from the bowels and*

kidneys contain live, active, virulent typhoid germs. It is in this way that the disease is spread.

When the man has got well from the disease he still excretes typhoid bacilli from his kidneys and bowels. Sometimes this keeps up for months. Occasionally it persists for years, and semi-occasionally for a lifetime. People who continue to excrete typhoid are called typhoid carriers. The reason is this:

A mother colony of bacilli will locate in the gall-bladder or in the urinary passages. The young are thrown out each day just as a hive of bees sends out swarms periodically.

The bacilli in the gall-bladder do not infect the man, because he is immune. But should they pass out and eventually get on the raw food eaten by a susceptible man they are fully capable of infecting him.

Then what is a man to do if he has the disease?

Get the best medical and nursing service possible and obey orders absolutely. Equanimity is necessary when one has typhoid fever—no worrying, no fretting—just quietly accepting and trusting. Therefore, take aboard pilots at once and let them walk the deck.

If proper freedom from worry, proper security for the family, and proper nursing cannot be had at home, then go to the hospital by all means.

What is the man to do who has not had the disease?

In ordinary times be careful of the water. Drink no suspicious water which you do not know to be right.

Of the milk—drink no raw milk unless you are positive that its source is safe.

Of raw fruits and vegetables—if they can be peeled, peel them yourself. If you are not certain of the raw vegetables eat cooked vegetables.

Of raw oysters and clams—unless you are certain of them, have them cooked.

Of flies—do not eat food in places where flies abound.

Of hands—see that your own hands are washed before eating. Insist that all who handle your food shall have clean hands.

Of cooks—at least in your own house see that no cook is employed who has recently (within six months) had typhoid or who has been in places where there was typhoid.

Following these directions, no man under ordinary circumstances should have typhoid fever.

The United States soldiers sent to the Mexican frontier in the spring of 1911 were vaccinated against typhoid. Those soldiers have been returned to their posts and Colonel J. R. Kean has reported to the surgeon general the lessons taught by that campaign. He compares the 12,000 troops stationed at San Antonio with 10,000 stationed at Jacksonville, Florida, during the Cuban War in 1898. In the Jacksonville troops there were 2,693 cases of typhoid fever, with 248 deaths. In the San Antonio troops there was one case of typhoid and no deaths. That some of this improvement was due to better general sanitation and better medical attendance is shown by the decrease in the number of deaths due to other causes from thirty-three at Jacksonville to eleven at San Antonio.

The decrease in typhoid was out of all proportion to the decrease in other

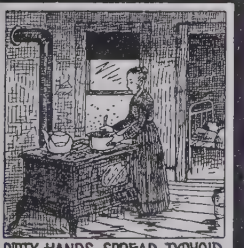
HOW TO GET TYPHOID

OPEN PRIVIES SPREAD TYPHOID

FLIES CARRY TYPHOID

OPEN WELLS ARE DANGEROUS

DIRTY MILK CARRIES DISEASE



DIRTY HANDS SPREAD TYPHOID

ABOUT ONE PERSON OUT OF THREE CONTRACTS TYPHOID

TYPHOID FEVER

HOW TO GET IT AND HOW TO PREVENT IT

More than one person out of three in North Carolina has had typhoid. If you haven't had it yet you are fortunate.

ABOLISH OPEN-BACK PRIVIES

Old open-back privies spread much typhoid. All privies should be fly-tight. In general, they should be placed over pits or holes in the ground about three feet square by four or five feet deep. In two or three years, if the pit becomes filled, dig a new one nearby and cover up the old one.

FLIES SPREAD TYPHOID

Flies carry typhoid and other diseases on their feet and bodies, and, worst of all, in their own excreta. Screen them out and abolish their breeding places.

USE PUMPS INSTEAD OF OPEN WELLS

Open wells are much more likely to be polluted than closed wells. Cover your well tight and use a pump.

BEWARE OF DIRTY MILK

Dirty milk is a breeding place for typhoid and other germs. Never drink milk unless you know it is clean.

DIRTY HANDS SPREAD DISEASE

Much typhoid is caused by handling food with unwashed hands after attending the sick, especially in the case of typhoid. Be clean.

FREE ANTI-TYPHOID TREATMENT

Why take further chances with typhoid? The anti-typhoid treatment will protect you absolutely. It is safe, practically painless and furnished free by the State. It is administered by a health officer or physician in three doses as shown below. Health officers administer it free. If your county has no health officer ask your family physician to secure it for you and have him administer it.

STATE BOARD OF HEALTH

RALEIGH, N. C.

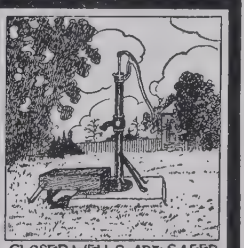
PLEASE PUT THIS PLACARD IN A CONSPICUOUS PLACE
ADDITIONAL COPIES FOR POSTING MAY BE HAD FOR THE ASKING

FREE ANTI-TYPHOID TREATMENT

HOW TO PREVENT TYPHOID

CLOSED PRIVIES PREVENT TYPHOID

SCREEN THE FLIES OUT



CLOSED WELLS ARE SAFER

CLEAN MILK IS HEALTHFUL

CLEANLINESS PREVENTS TYPHOID

Chicago Health Department.

FIG. 136.

causes. As the result of this experience the surgeon general has ordered that all soldiers shall be periodically vaccinated against typhoid fever.

In certain localities in this country it is becoming the custom for men going off for vacations to have themselves vaccinated.

People who live in other localities had better pursue the same policy if their community has a high typhoid rate or if they are going to travel in a country having a high rate or be in hotels or other stopping places where they are not certain of the care of the food.

Travelers in central Europe, including England, are safer than when at home. Travelers in Asia and Africa, Central and South America, and the islands generally had better be vaccinated before leaving.

WALKING TYPHOID

There are people who take life seriously. There are others to whom everything is a joke. There are people who take disease seriously. There are others who have their diseases in milder form. One man may have one disease seriously and another one mildly, while his neighbor may reverse the degree of response to the invading cause. People differ in their way of doing things and disease is no exception to the above general rule.

While the typhoid bacillus in two people may be the same in virulence, just as poisonous, just as active in growth, just as prompt in getting into the blood stream, the disease in the two individuals may be widely different. *It is the man who makes his disease.*

The virulence of the bacilli of typhoid is not to be judged by the virulence of the disease. It is just as dangerous to have a case of walking typhoid around the milkhouse as it would be if he were violently ill, even more so, for in that event he would be in bed away from the milkhouse, and there is a pretty good chance that the nurse would wash her hands before leaving the presence of the sick man.

Perhaps the reader wonders how anyone is to tell when typhoid is typhoid if every man makes his own typhoid. Just there is where diagnostic skill comes in. Ability in guessing the typical and early cases rightly makes the difference between good and poor medical service.

But fortunately, in recent years, some tests have been discovered that help out. Such are the blood tests for typhoid fever, and especially the Widal tests and the bacteriologic blood examination. Every state and most cities now have laboratories where these tests are made free of charge. A drop of dried blood on a clean piece of glass is all that is required.

In the winter time the typhoid fever in a city is something the government can properly be blamed for. In the fall a good part of the blame falls on the shoulders of the people themselves. The fall rise in typhoid fever means infection by careless people, walking typhoid carriers, typhoid milk, and by flies.

I notice that Dr. Hurty of the Indiana State Board of Health chided the rural citizens of his state with being less clean than they ought to be, whereupon a local granger rose up and called him names.

Typhoid is more nearly a filth disease than is smallpox or most any other disease.

Chicago's typhoid rate for 1912 should be under 8. Indiana's is over 34. Chicago is far from clean. Under this test, how about Indiana? Would it not be well for the granger to make a survey of local conditions similar to the one made by Professor Condra of Nebraska, and then decide on the facts as the survey shows them?

FOODS THAT CAUSE TYPHOID

Milk and water are foods, but they are so important as spreaders of typhoid that I have treated them separately. The other foods are not of much importance as compared with milk and water.

In considering foods three questions should be in mind:

1. Is the food to be eaten raw?

2. If it is cooked, is it handled after cooking by anyone who has recently had typhoid or been around typhoid?

3. Have flies got on it after cooking?

Articles to be watched are fruits, cabbage, lettuce, tomatoes, celery, radishes, onions, watercress, cucumbers, raw oysters and clams.

To begin with, no one should buy vegetables or fruit from a store, stand, or wagon where things are not clean. Articles of food exposed where dust, flies, dogs, and cats can get at them should cause customers to buy elsewhere.

However clean fruits and vegetables may look, before they are eaten raw they should always be washed in clean water. Celery should be split up so that each leaf can be washed.

It is inadvisable to eat raw oysters. Methods of oyster shipping have improved greatly in the last two years. More than half the oysters are now shipped in excellent fashion. There is still some sloppy, open icing and dipping in stores, but the customers can control that end of it by refusing to buy oysters out of an open bucket in which there is a chunk of ice and a dipper not so clean as it ought to be.

The principal reason for warning against raw oysters and clams is that so many of the beds are not properly supervised and so many of the oysters are being floated or fattened in foul water. Until oyster beds are better supervised and more information is available as to which are right and which are not, oysters and clams should be cooked before being eaten.

No person should handle food who has recently had typhoid fever or who is a typhoid carrier. Washing the hands before handling food and before eating is not a fad. It is the best of common sense and prudence. Nobody should ever eat without washing the hands.

Flies can carry typhoid bacilli to the sugar, the bread, the butter, or any other article of food. The flies in a house may not have typhoid on them, but the person eating has no way of knowing, therefore the only safe policy is to keep flies away from the food.

CONTACT OR FINGER TYPHOID FEVER

Two years ago in a household on the west side of Chicago every member of the family had typhoid fever within three months. Two members of the family died of it. First one got sick and later another, and so on until it

Illinois State Board of Health. Cartoon No. 4.

FIG. 137.—DEADLY PARALLELS. Perhaps this explains the "fine mineral flavor" you notice in well water.

went through the family. Had all of them got sick at the same time we would have thought of milk or water as the cause. They lived in an insanitary basement, but a study of the epidemic led us to think the cause was in the household. That was the cause of all of the cases after the first.

A few years ago there was a milk epidemic in West Pullman. Ten days after the use of the typhoid-infected milk was stopped the cases of typhoid fever quit developing. In one household there were cases during the period of milk contamination and one developed some weeks after the use of the infected milk was stopped. This was a case of contact typhoid.

Typhoid is "catching." It is not so catching as smallpox or measles. If 100 persons who have never had smallpox diseases or have never been vaccinated are brought into close contact in a room with a case of smallpox more than 90 of them will contract the disease. Measles is about as "catching" as smallpox.

If 100 people who never had typhoid or who had not been vaccinated against it were brought in close contact with a case in a room, all of them might escape having the disease. *Everything would depend on whether they swallowed any typhoid bacilli or not.* Typhoid bacilli are liable to get on the hands, the bedclothes, and on articles around the room. The excretions of the patient are certain to contain them. Bits or droplets of excretion too small to see with the naked eye can get on the hands or on articles around the room. The nurse's hands are certain to get infected. The patient cannot be cared for without infecting the hands of those who care for him. *Whenever the hands remain infected for any length of time the infection is pretty certain to reach the mouth.* The hands are traveling to the mouth frequently. Infected hands are liable to infect food.

Flies carry infection from the excretions of the patient to the food.

It is in these ways that contact infection occurs. There is no air infection. To visit in the room, if nothing is eaten and the hands are washed after the visit, is absolutely safe. Then in order that a patient may not cause contact infection it is necessary: (1) to have everybody's hands washed frequently—especially those of the patient and nurse; (2) to have the excretions and all vessels used therefor sterilized with carbolic acid, bleaching powder, or some other strong antiseptic; (3) to have the bedclothes kept clean; (4) to have the patient and his excretions protected against flies; (5) to have the food kept clean and especially to have it protected against flies and against handling.

If these things cannot be successfully accomplished in the house the patient should be taken to a hospital. No other course is fair to the other members of the family.

Good nursing and good medical care are about as necessary for the protection of the other members of the family as for the welfare of the patient. If such nursing and medical care cannot be had in the home the hospital is at hand.

If the family, or any member thereof, is engaged in handling food for sale, then the patient should go to the hospital, or a high grade nurse should take entire charge of the patient and the family should do nothing more than visit. I have known of several local epidemics of typhoid fever due to some wife or mother trying to nurse the patient and at the same time attend to

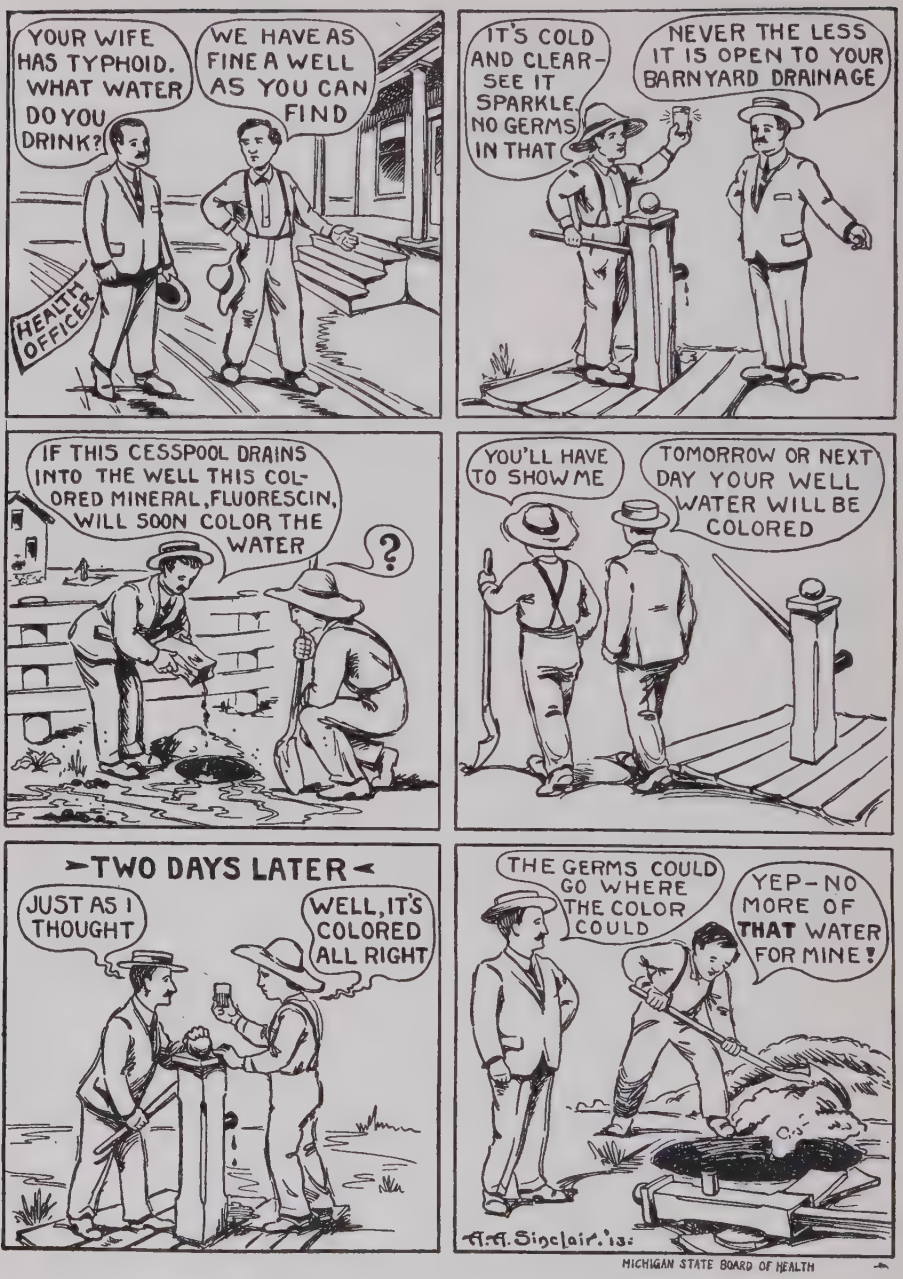

YOUR WIFE HAS TYPHOID. WHAT WATER DO YOU DRINK?
WE HAVE AS FINE A WELL AS YOU CAN FIND
HEALTH OFFICER
IT'S COLD AND CLEAR- SEE IT SPARKLE. NO GERMS IN THAT
NEVER THE LESS IT IS OPEN TO YOUR BARNYARD DRAINAGE
IF THIS CESSPOOL DRAINS INTO THE WELL THIS COLORED MINERAL, FLUORESCIN, WILL SOON COLOR THE WATER
?
YOU'LL HAVE TO SHOW ME
TOMORROW OR NEXT DAY YOUR WELL WATER WILL BE COLORED
TWO DAYS LATER
JUST AS I THOUGHT
WELL, IT'S COLORED ALL RIGHT
THE GERMS COULD GO WHERE THE COLOR COULD
YEP- NO MORE OF THAT WATER FOR MINE!
A. A. Sinclair. '13.
MICHIGAN STATE BOARD OF HEALTH

FIG. 138.

the milk or wait on customers in the store. *No one should patronize a milk producer or milk dealer or buy goods in a grocery store, delicatessen, or bakery where a case of typhoid fever is being cared for on the premises.*

Typhoid will not spread in a family where cleanliness prevails.

ACTIVITY OF TYPHOID

Drs. Sedgwick, Taylor, and McNutt of the Massachusetts Institute of Technology have attempted to find the answer to the question: Is there more typhoid fever in the city or in the country? It ought to be a disease of the city, because it is a disease of crowding, one party says. It ought to be a disease of the country because it is the result of pollution of food and water supply, and, whereas the cities try to protect their food and water, the village, township, and county authorities make no effort, says the other.

Statistics show that where a city is grossly careless about its water and food it has a typhoid rate much higher than that in the country. They also show that when a city is exceedingly careful it has a typhoid rate that is lower than that of the country.

This study was made in New England, and the conditions there do not exactly parallel those in the other parts of the country. The investigators conclude that in New England there is less typhoid in the country than in the cities and towns.

Benjamin Franklin said that war was always paid for, but the plan was deferred payments. According to these scientists the soldiers returning from the Civil War infected rural New England. For twenty-five years some of the deferred payments for the war took the form of rural typhoid. Hence, for a quarter of a century there was more typhoid in the country than in the city. Since that time the pendulum has swung, and the cities are feeding typhoid into the country. Typhoid feeds into its surroundings, whether it be city or country typhoid.

The city health authorities run down epidemics of typhoid to their origin in some milk farm in the country and then roundly abuse their country cousins. Or some cases of typhoid start in a hotel at some springs in the country and find their way into city homes. When the city authorities get the facts they publish them.

The Institute of Technology scientists say the shoe is often on the other foot. The country people have not the same agents of publicity. Therefore, nobody hears of the case of typhoid carried from the city to the country.

They quote Professor Bass' investigation of the Mankato, Minnesota, epidemic, wherein seventy-two cases of and five deaths from typhoid occurring in the country around Mankato were traceable to the epidemics in Mankato. Some of these radiated cases went to the country around Seattle, Washington; Cedilla, Michigan; Towner, North Dakota; and White, South Dakota.

HOW WINTER TYPHOID IS SPREAD

The typhoid rate should be divided in two parts—the winter rate, comprising the rates for December to May, inclusive, and the summer rate, that of the remainder of the twelve months. *The winter rate indicates how much filth gets into the water supply. The summer rate indicates how much filth gets into the entire food supply, including the water.*

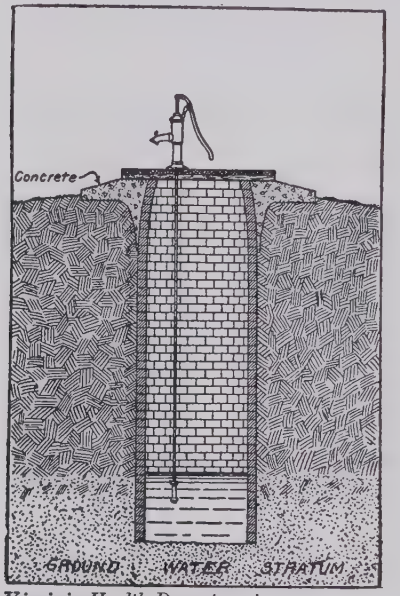
Freeman says: "We have learned by sad experience the measure of typhoid fever in any community is the measure of the distribution of human

filth in that community, and that the dissemination of human excrement will inevitably result in the spread of typhoid fever."

In the winter the conditions for the spread of filth to other foods than water are not good. The few typhoid bacilli that get into milk are killed off before they come to the consumer. The few flies stay so close to the warm places that they do not carry infection, at least in cold climates.

But the sewers empty their contents into the water supplies during the winter as well as during the summer.

The consensus of opinion is that water is about as dangerous in cold weather as in warm. There may be local conditions that modify this rule in certain cities, but it is true as a rule. Therefore the amount of winter typhoid is pretty nearly a measure of the habitual and customary water pollution of a given community.



Virginia Health Department.

FIG. 139.—SAFE WELL.

The existence of a typical winter typhoid is better known than the same condition as a summer complaint. Winter cholera and winter diarrhea are names by which it is known. When Vaughan was investigating typhoid at Chickamauga he found proof that much of the typhoid had been called diarrhea, summer complaint, and similar names by the physicians in attendance. It is rather natural to ascribe diarrhea in summer to fruit, vegetables, and other foods. In winter it is more apt to be recognized as a typical typhoid.

Winter typhoid is spread through infection of the water. The method of prevention is either to prevent infection of the water or to stop the use of infected water. Municipal filtration will do this; so will treatment with hypochlorite. A proper household filtration will do it. However, individual household filtration has generally been of little service in lowering the typhoid rates. Boiling the water will do it. Here, also, individual action has never been of much service. Winter typhoid is a community disease which must be met by community measures.

If we could manage to stamp out winter typhoid the control of summer typhoid would come within reach. It should get on the same plane as smallpox. The only agencies left to carry it over from season to season would be carriers, and the number of effective typhoid distributers is not large. The problem would then be about as difficult as the smallpox problem and no more so.

Suppose a man lives in a town with an infected water supply, as shown by a high winter typhoid rate. What can he do? Get vaccinated and then agitate all the harder for better water. As Freeman says, "The problem remaining for solution is how to convince the American people that protection from typhoid is something worth spending money for."

Preventing Typhoid.—*J. M. writes:*

"1. Would you advise vaccination as a preventive of typhoid fever?

"2. Is such vaccination safe?

"3. If cows drink water in which typhoid germs are present do these germs appear in the milk?

"4. Should such milk be boiled?

"5. How long should water be boiled?"

REPLY.—When an epidemic of typhoid fever is on:

1. Nothing should be eaten raw.
   No raw water.
   No raw milk.
   No raw vegetables.
   No raw fruit.
   No raw oysters.
   Nothing raw.
2. All typhoid should be promptly reported to the health department.
3. A modified quarantine (typhoid quarantine) should be established.
4. All nurses, or all doing nursing duty, should be instructed in detail how to take care of their patients.
5. All the people should be vaccinated against typhoid.

Such a policy will stop the outbreak of new cases in two weeks. It takes ten days for typhoid to develop after infection.

Now, answering your questions in detail:

1 and 2. Yes.

3. No.

4. Yes, for one minute after it starts to boil. Then keep it warm for fifteen minutes. Cool quickly.

5. Same length of time as milk.

Milk and Typhoid.—*X. Y. Z. writes: "I have been taking milk and cream daily from a milkman who has a case of typhoid fever in his home. He tells me the doctor says there is no danger at all of the disease being carried to the customers. Please advise me."*

REPLY.—You should not use milk from a milk dealer who has typhoid fever in his home, unless you know "for sure" that the man who handles the milk does not see the sick person or touch anything which goes into the sick room. It is possible to handle raw milk with safety on premises where there is typhoid fever, if the dealer is very intelligent and very careful, but ninety times out of a hundred it is too risky.

Typhoid Vaccination.—*G. W. M. writes: "Why is it that typhobacterin is not recommended for use in persons over 40 years of age?"*

REPLY.—There is no reason why a person over 40 who has not had typhoid and who is to be exposed to it should not be vaccinated against typhoid. At the last meeting of the American Medical Association such vaccination in old people was reported. Generally speaking, old people do not need it so much as the young ones.

Cesspools and Typhoid.—*J. W. D. writes: "In your paper you have a department for typhoid fever? We have had considerable typhoid in our vicinity. I claim part of the sickness is from not having sewers, but, instead, having cesspools, and that our drinking water is bad by having*

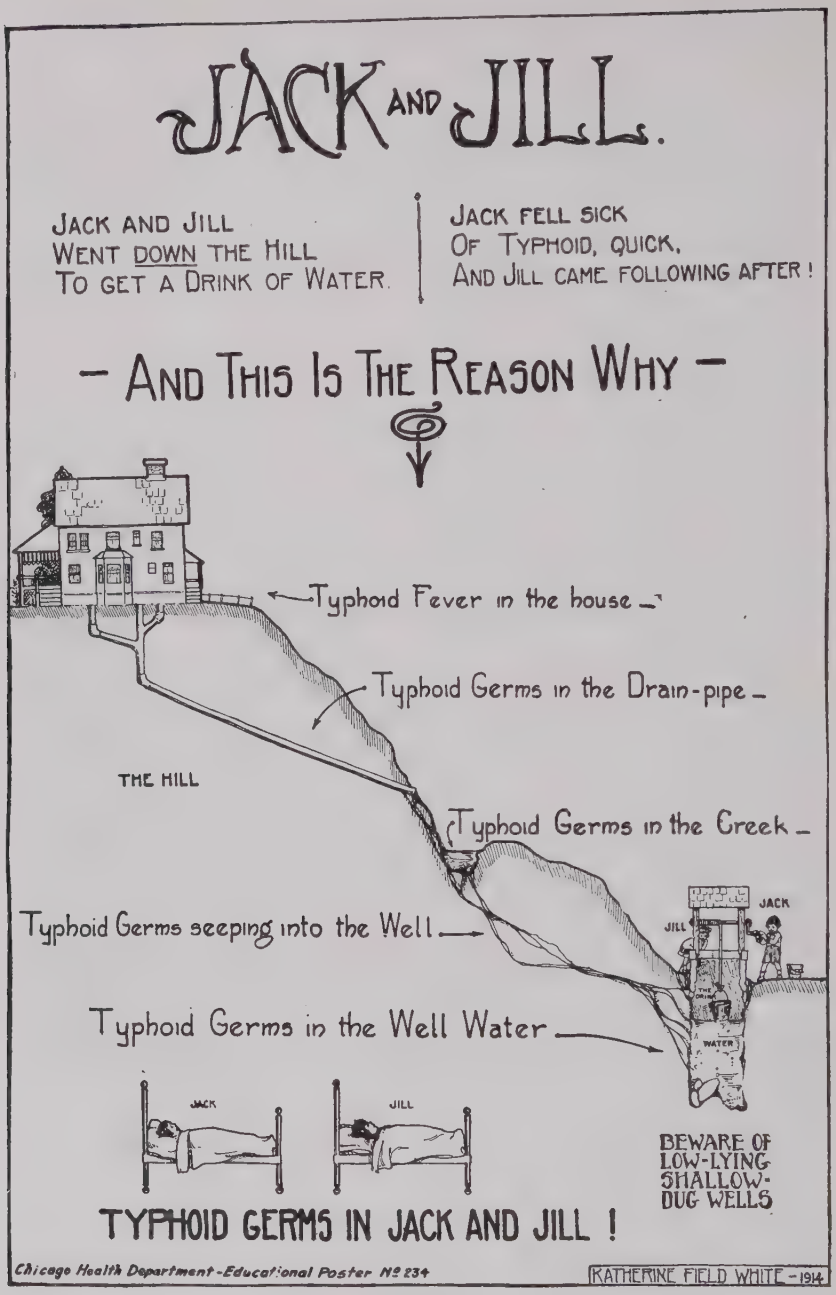

JACK AND JILL.
JACK AND JILL
WENT DOWN THE HILL
TO GET A DRINK OF WATER.
JACK FELL SICK
OF TYPHOID, QUICK,
AND JILL CAME FOLLOWING AFTER!
— AND THIS IS THE REASON WHY —
Typhoid Fever in the house
Typhoid Germs in the Drain-pipe
THE HILL
Typhoid Germs in the Creek
Typhoid Germs seeping into the Well
Typhoid Germs in the Well Water
JACK
JILL
WATER
JACK
JILL
BEWARE OF LOW-LYING SHALLOW-DUG WELLS
TYPHOID GERMS IN JACK AND JILL!
Chicago Health Department - Educational Poster No 234
KATHERINE FIELD WHITE - 1914

FIG. 140.

cesspools dug down to running water. I would like to have your opinion on the matter."

REPLY.—The conditions you describe are usually responsible for typhoid fever. Cesspools reaching to or nearly to the strata which carry the water

which supplies your wells are reasonably certain to give you polluted water. This water from time to time will become infected. When cesspools and wells are located near each other there are usually found other causes of typhoid not closely related to these. A community which has a good deal of water typhoid usually has more than the average amount of milk, fly, and finger typhoid. The better care of sewage and the better protection of the drinking water also helps to decrease these other forms of typhoid infection. And also when typhoid rates fall other disease rates fall.

Developing Typhoid Fever.—*J. C. S. writes: "Kindly tell me if anything can be done to prevent typhoid fever. The patient threatened with it a week ago has taken nothing but liquid foods since. Shall she continue with the liquid diet?"*

Reply.—Vaccination, boiling the water, boiling the milk, screening against flies are the most important methods of preventing typhoid. However, with your friend it was too late to talk about preventing the disease at the time you wrote your letter. The typhoid bacillus gets in the body and stays there ten days before any symptom develops, and two weeks before the symptoms look much like typhoid. After the patient begins to have fever or to get weak it is too late to prevent the disease.

Avoiding Typhoid Germs.—*Drummer writes: "What am I, a traveling man, to do to be sure of avoiding typhoid? I'm afraid of that disease, but traveling constantly I cannot boil the water I drink or guard against the carelessness of cooks and waitresses in the hotels."*

Reply.—Get vaccinated against it. If you are from Wisconsin, the state board of health will furnish the serum. In any event your physician can get it for you.

Protection of Typhoid Vaccination.—*H. C. asks how long the typhoid inoculation lasts and if it protects against malaria. Vaccination lasts for seven years, he is told.*

Reply.—Typhoid vaccination requires twenty to thirty days. Beyond a temporary redness at the points of injection there is no inconvenience or other ill effect. It will not protect you against malaria. The way to prevent malaria in the tropics is to protect yourself against mosquitoes. This properly done is effective after you strike a district where the mosquitoes are infected. Your danger of malaria will be proportioned to the number of mosquitoes which bite you. The inoculation against typhoid will protect you for five months. It will make you reasonably safe for an additional seven months.

Filters.—*A. W. W. asks the following questions: "Is there a filter made which can be attached to the faucet, which will destroy typhoid germs?"*

Reply.—Any of the artificial rock filters which attach to the faucet will filter out typhoid bacilli. All parts of the filter must be kept clean. At short intervals the candle must be baked out. Otherwise the typhoid bacteria grow through it and the filter does more harm than good.

Winter Cholera.—*O. C. sends the following clipping from the* Tribune *and suggests the advisability of furnishing more information on the subject:*

"Waukegan, Ill.—Jan. 2.—[Special.]—Winter dysentery among infants has been discovered in Chicago by scientists and is said to be prevalent in northern Illinois. When a Waukegan physician who

North Carolina Health Bulletin.

FIG. 141.—TO PREVENT TYPHOID.

had charge of a six-months-old son of Mr. and Mrs. Walter Ellis called a Chicago laboratory by telephone he was informed they had had many inquiries about similar cases.

"It is said to be an entirely new disease.

"The child died this morning."

REPLY.—Winter diarrhea, also called winter dysentery, is typhoid fever. In 1908, Dr. Breitenbach reported to the section on preventive

medicine of the American Medical Association a so-called epidemic of winter diarrhea in a Wisconsin city. The people were trying to fool themselves and everybody else by calling their epidemic winter diarrhea. The proof was conclusive that the disease was typhoid and due to polluted water. Many such reports are on record.

Cause of Typhoid.—*D. A. Carson writes: "In your article in the* Tribune *of today you do not come out and squarely say that bacteria causes typhoid fever, but you say: 'It is a bacterial disease. The bacteria are taken in with food and water,' and hence I am forced to believe that you mean to assert that bacteria are the cause of the disease. I have heard other doctors make this assertion and I have asked many of them how they know that bacteria cause typhoid fever or any other disease. I have not been able to get a satisfactory answer to my question from any of them. The best they can do is to say bacteria are found in the discharges, etc., of typhoid patients. That proves really nothing more than the fact of its presence. Several doctors have told and the books tell me that the same bacteria that are found in the discharges of typhoid patients are also found in other diseases. As this has never been denied as far as I can learn it is strong testimony against your theory that typhoid is caused by the so-called typhoid bacteria.*

"I think you should in your Tribune *articles prove your assertion as to the cause of typhoid. It will not do to merely prove its presence in the typhoid patient nor to say the theory must be true because 'it was made in Germany.' Unless you prove your assertion all your talk will go for nothing and no thinking person will believe one word of it."*

Reply.—Typhoid fever is due to the typhoid bacillus. The proof is:

1. The bacillus is found in the blood and organs of people having typhoid fever. It is also found in certain of the excretions of those having typhoid fever or who have had typhoid fever.

2. It is not found in the blood or organs of anyone who is not suffering from typhoid fever. It is not found in the excretions of anyone except those who are suffering from typhoid or who have been infected with typhoid at some time.

3. It is not found in the blood or in the excretions of animals which do not have typhoid.

4. The blood of a person having typhoid fever will first clump and later destroy typhoid bacilli. It will not cause this effect with other bacteria under like conditions.

5. Typhoid bacilli cultured from the blood of a person in an early stage of typhoid will be first clumped and later destroyed by blood taken from another person who is in the midst of a developed typhoid.

6. These bacilli will not be clumped by other blood when applied under like conditions.

7. It has been proved that people with typhoid infect other people with the disease.

8. It has been proved that under certain circumstances people with typhoid infect water, milk and other food substances. It has been proved that people with typhoid had consumed food in which there were typhoid bacilli.

Koch laid down certain laws which must be conformed to and the fact of conforming proved before it could be proved that a certain bacterium caused a certain disease.

Typhoid fever meets every one of these requirements.

FOOT AND MOUTH DISEASE

Foot and mouth disease is a malady of cloven footed animals. It belongs in Europe. Rosenau tells us that it has invaded this country on several occasions prior to the last.

When the disease was discovered the Bureau of Animal Industry took active charge of the invaded districts and within a few weeks the disease was under control. Its complete suppression necessitated the killing of a large number of cows and was done at great expense.

In this epidemic the same bureau assumed charge as soon as the diagnosis was made and the situation is being handled in its usual masterly way. The disease will shortly be under control and before long it will be eradicated but the expense to farmers and to governments will be great.

The cause of the disease is a microbe too small to be seen with any microscope. It passes through the pores of a porcelain filter and therefore it is classed as a filterable virus. This was the first ultra-microscopic filterable virus to be discovered.

The virus can be transmitted to human beings by the milk. Although the disease in animals is violent and often fatal, in the human subject it is mild. It occasionally produces death.

Children sick with foot and mouth disease have fever and vomiting; small blisters appear in the mouth; swallowing is difficult; sometimes slight blisters appear on the fingers.

Rosenau says: "Man is infected through the ingestion of raw milk, buttermilk, butter, cheese, and whey from animals suffering with foot and mouth disease. It may also, though more rarely, be transmitted directly from the salivary secretions."

Rosenau also says that foot and mouth disease cannot be transmitted by vaccination or any other variety of skin wound.

The virus is easily killed by heat. Experiments made in Denmark and Germany have proved this. Milk pasteurized at 140° for twenty minutes is safe.

There is no reason for alarm. So long as the disease continues all milk and milk products from the infected districts should be pasteurized. Any consumer of milk who is not certain of his supply should pasteurize at home. Physicians in the district or near it should inquire carefully into their cases of stomatitis.

FIGHTING FOOT AND MOUTH DISEASE

From three to ten days after exposure the infected person is attacked by chill followed by general aching. The fever goes to about 102°. There is vomiting and diarrhea. About three days after the beginning of the fever the mouth becomes inflamed.

The most frequent affection in the mouth is a crop of small, clear blisters. These appear on the inside of the lips and cheeks, on the gums and tongue. They seldom appear on the hard or soft palate.

In most cases the crop of blisters is preceded by a fall in the fever. If the fever keeps up it is a sign that a second or even a third crop of blisters will follow, coming at intervals of three to four days.

The worst epidemic of foot and mouth disease on record was one occurring in Berlin and reported by Sergel. In that epidemic there was much swelling of the gums and the tongue swelled so as to protrude from the mouth. Many of the cases of that epidemic died as the result of pneumonia, Bright's disease and extreme wasting.

The disease is usually spread by the drinking of raw milk from infected cows. To settle the point Hertwig drank some infected milk and gave some to his assistants. The disease resulted.

To prevent the disease from spreading Nicolaier says that the following procedures should be followed:

All infected and exposed cows should be quarantined.

All infected people should be quarantined.

All milk from sick cows should be destroyed.

The general milk supply should be thoroughly pasteurized.

These are provisions of the German law. That law does not require that butter from infected animals should be made from pasteurized milk. In this Nicolaier thought the law was faulty.

It is generally agreed that the disease may be dangerous, especially to children. An infected person may infect a susceptible person by contact, such as kissing.

FOOT AND MOUTH DISEASE EASILY AVOIDED BY PEOPLE

When Mediaerr wrote about foot and mouth disease in the human subject he was able to gather together histories of one hundred and forty cases. In the medical history of the entire world there had been recorded less than two hundred cases of human foot and mouth disease.

Nicolaier said he was sure there had been more cases and with this Sergel agreed. In fact everyone who has written on the subject has agreed that the physicians have failed to recognize many of the cases of foot and mouth disease. How could it be otherwise with a disease so rare and so little understood? How can you expect an American physician to make a diagnosis?

But after due allowance has been made the fact remains that foot and mouth disease is not now and never has been much of a menace to human beings. It is not at all to be compared with consumption, typhoid fever, pneumonia, scarlet fever or any other of a dozen diseases which are always with us. Aside from the fact that it has rarely affected persons there is the ease with which human beings can protect themselves against it.

Meat is not a menace. Meat from government controlled slaughter houses is not a menace in the raw state. Cooked meat is absolutely safe. Pasteurized milk is safe and any citizen can get pasteurized milk. The man who purchases raw milk is needlessly endangering the life of his family.

Butter from pasteurized milk—usually called pasteurized butter—is also safe. There is plenty of that on the market. Anybody who wants pasteurized butter can get it.

The foot and mouth disease is a stockman's peril. The consumer of milk and meat has no reason to be panicky.

Human Foot and Mouth Disease.—*K. J. M. writes: "Being interested in science and my brother man, I send you this report that, should you think it advisable, you can warn your readers to 'boil the milk.'*

"I am satisfied since reading your article giving symptoms of hoof and mouth disease that I am recovering from an attack of that plague. I give you my case.

"Twelve days ago I felt badly and noticed a slight sore throat. Fearing I had 'caught' some one's tonsillitis or 'grip,' I gargled several times with listerin. Toward evening I had a slight chill and some fever; only took temperature once, 100 1-5; do not think it went higher.

"For several days my throat got worse and I wondered what made blisters on back of my throat, tonsils, inside of lips and cheek, and on soft palate, none on roof of mouth or on gums, though latter were swollen. I don't think there were more than a dozen or so of these blisters, but all the time other red places came out inside my lips and cheeks, which seemed to bleed slightly, as I noticed in expectorating (there was constant flow of saliva) there were streaks of blood and I found these bled easily.

"As my throat got worse my tongue did, too, not on surface, but at 'root' or back it was swollen and hurt to move it. This more than sore throat made swallowing very painful for a week.

"The front edge of my tongue and under it, back of mouth and throat are still much inflamed and inflammation has reached my chest, making me feel like I had a severe cold there, though I have had no signs of a cold. I had no vomiting, no diarrhea.

"Now my husband is on his fourth day of infection, with exactly the same symptoms. I have not consulted a physician, as it seemed more painful than alarming, and I am one of those that 'take three days to decide to go to a doctor and then back out.' As a precaution we have avoided everyone for several days. Do you think we have this disease? Should we fumigate, and with what?"

Reply.—If you have the disease, boil or burn all handkerchiefs, towels, and clothes that come in contact with your mouth secretions. Use no cups, spoons, or plates used by others. Use chlorinated lime solution freely around the room.

When you have recovered wash all woodwork with 5 per cent. solution of carbolic acid. Air and sun your rooms well.

That you have recovered does not prove that you did not have the disease. The fine stock at the yards recovered, all of them, and they certainly had it.

Prevalence of Human Foot and Mouth Disease.—*Veterinarian writes: "In your article on foot and mouth disease I believe you have not only underestimated the human susceptibility for the disease but also the number of cases on record, both mild and fatal.*

"Hutyra and Marek, a late work on veterinary science (Vol. I), quote Bussenius and Siegel, 'Sixteen epizootics occurred in man in the years of 1878-1896, in the course of which entire families, sometimes all inhabitants of certain houses, and even townships, became affected. During different outbreaks the cases terminated fatally in thirty-six, twenty-six, and sixteen instances respectively.'"

Reply.—Nicolaier, whom I quoted in my article, quoted Bussenius and Siegel at length. In fact, most of the 140 cases collected were from that source. I have just read Hutyra and Marek's article. They say that the

disease is not of great importance from the human standpoint. "This disease develops in man usually in a mild form, except in children, in which an associated gastro-intestinal catarrh may lead to death. During some of the outbreaks, however, adult persons also became severely affected."

ROCKY MOUNTAIN FEVER

In the Rocky Mountain states there exists a disease known as the Rocky Mountain spotted fever. Within recent years cases have been reported in Montana, Idaho, Wyoming, Washington, Oregon, California, Nevada, Utah, and Colorado. The disease is not especially severe. The death rate is less than that of typhoid fever. When a man gets sick with typhoid fever he expects to get well and the chances are about fifteen to one that he will.

From the epidemic standpoint the disease is not very important. The Public Health Service was able to get track of only 440 cases of it during 1914. Of these twenty-nine died.

There are a few counties in Montana, Wyoming and Idaho that do not settle up because the people are afraid of tick fever. This last fact is one of the reasons why the government is actively working to eradicate Rocky Mountain spotted fever.

What seems to be a more important reason is that it wants to make two demonstrations. First it wants to show the people how a centralized national agency for the conservation of human beings could—shall we say can?—operate to eradicate an endemic disease. What could be done with this disease could be done with any other endemic disease which had been repressed to the proper point for work for suppression.

Second, it wants to demonstrate the method of suppression applicable to this particular disease. This fever is spread by wood ticks. The ticks live on gophers, squirrels, coyotes and every other species of wild animal. To suppress this fever it is necessary to get rid of the ticks.

To rid a region of ticks the government advises killing the wild hosts, dipping all domestic stock, cleaning out the undergrowth and sheep grazing.

Of these measures, the most effective is sheep grazing. When sheep graze over a piece of ground they gather up all the ticks.

Ticks will leave any animal for a sheep. When they get into a sheep's wool between 80 and 90 per cent. of them die.

To get the other 10 to 20 per cent., the government recommends that the sheep be grazed high up the mountain side. A flock of sheep start grazing in the valley. The sheep graze up the mountain side. By the time the surviving female ticks are fully grown and gorged with blood the sheep are above the range of gophers, chipmunks, squirrels and wild animals generally. The females drop off, lay their eggs and die. The larvae hatch out and finding no small animals to live on, die.

It is common information that there is no tick fever on the east side of Bitter Root Valley. Many years ago 40,000 sheep were put on this slope. The method of grazing was just that described. The "snoozers" cleaned that side of the valley of ticks without trying or having any idea of the good they were doing.

Apparently it is within the power of the sheepmen to redeem the coun-

try. This should improve the standing of the "snoozer." It might make O'Henry sit up in his coffin.

Rocky Mountain spotted fever is an American disease. It is not found outside of the United States. If we annihilate it here the world will be permanently rid of it. Our responsibility toward it is the same as that of the few countries in which yellow fever is left.

TYPHUS

Typhus is, or was, the war disease. Hirsch begins his chapter on typhus as follows: "The history of typhus is written in those dark pages of the world's story which tell of the grievous visitations of mankind by war, famine, and misery of every kind. . . . The history of typhus in war affords further classical proof of the influence of overcrowding, filthy and unventilated spaces, upon the development of the fever."

The history of this disease shows that war has been the chief agency of its spread. In fact, Mexico was free of it until the Spaniards, bent on conquest, brought it with their armies in 1570.

While most of the records of typhus relate to wars of a hundred years or more ago it has come down to our day. It was responsible for a heavy death rate in the Crimean War and also in the Russo-Turkish War of the late '70's. It was troublesome among the French troops in the war of 1871. There is information that in the Madero revolution of five years ago the disease was quite prevalent. It has raged in Serbia.

In Mexico typhus fever is always present in the tierras frias, the colder plateau lands south of Torreon. This tableland is the normal habitat of typhus in Mexico; but it is reasonably certain that the disease can be carried by the Mexican troops wherever they go in Mexico. They carried it to Juarez; they can and will carry it to whatever tropical district they go.

A physician who had practiced medicine in Mexico for many years was asked what were the worst diseases that we might expect in case of war with the southern republic. His reply was that the greatest menace to life would be typhus. Venereal disease would be the greatest disabler.

The typhus that we shall encounter there will not be of the mild type found here. There the disease is violent. It has a case mortality of 80 per cent. We in this section have no personal knowledge of so violent a form.

Where's the hope? There is good evidence that typhus is spread by lice. We may prove that this is the only method of its spreading. At any rate we shall work cleanliness and louse killers to the limit to protect our men. Those sick with typhus will be protected against lice. The well will be examined for lice frequently. Louse killers will be distributed freely.

Typhus is a disease of bad sanitary conditions. It has never thrived where there was any sort of sanitary standard. It may not be a filth disease, but it comes nearer being one than typhoid, and is infinitely more a filth disease than smallpox.

Nobody has it except people housed in filthy places. It develops in filthy jails, filthy construction camps and filthy army camps.

CHAPTER XX

Habit-Forming Drugs

Farmers' Bulletin No. 393, Department of Agriculture, is on the subject of habit-forming drugs. I do not know why this was issued as a farmers' bulletin, except that there is no place in our scheme of government for people's bulletins. Farmers have no more drug habits than the general run of people. On the other hand, it has been said there are more drug habitués among physicians than any other class.

This bulletin says it is estimated that there are more than 1,000,000 drug addicts in the United States. Another statement is: "The amount of opium imported into the United States so far during the present decade indicates that the amount per capita is about the same as for the preceding ten years."

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FIG. 142.—TAKING PATENT MEDICINE BY THE CLOCK.

Crothers says that two-thirds of the morphin used is consumed by addicts.

There are three reasons for this article. The first one is that the morphin disease is no trifling matter.

The morphin habit is always acquired under an alias. A man seeks to escape a pain and justifies himself in taking morphin by saying a dose, or a few doses, will do him less harm than the pain. His mistake is in not seeing that he is really deciding between the pain and the habit.

A man seeks to get a needed night's sleep with morphin. He weighs one night against one dose. He should be able to see the end of the string and know that he is weighing a habit against a temporary discomfort. A man is temporarily in straits and feels that he has not the grit to carry himself over. He takes a dose of morphin, forgetting he is only "laying the question on the table," and that when he takes it up tomorrow the morphin will have left him with even less grit; the difficulty to be met has grown as it lay unmet.

The second reason for writing this article is to call attention to the score or more of paths that seem innocent enough, but that lead to fiend-dom: cough medicines, sleep medicines, refilled prescriptions, opium cures,

which contain opium, morphin, or codein, medicine for pain, and the like. The man who begins with these does not fight out the question, "Will I be an opium fiend?" While he is strong he cannot conceive of any answer but no. But let him consider what his answer will be when the question is put—that is, when the time has come that his will is weak and his grit has gone.

A large part of the opium addicts are neurasthenics by inheritance. A large part are neurasthenics from lack of training in self-control. Another part become mentally disturbed by the drug. Certain types of criminality are frequently found in drug fiends.

The third reason for writing this article is to set forth the justice of taking morphin into consideration in judging the motives of addicts, and to suggest that opium fiends cannot be cured or helped by punishment. They must be patiently and persistently helped and then retrained. Cure is not effected when morphin is no longer used. They are not cured until they have got a grip on themselves and a new hold on affairs.

It is the duty of the physician to examine closely and find out not only what is the organic basis, but also its relative value. For him to become impatient is to miss the point. He must catch the patient's point of view and then, through suggestion, analysis, reason, bring him to a better viewpoint, and patiently hold him there until he can stand alone.

Even in organic diseases, while the basic organic changes cannot be altered, the physician who is wise, sympathetic, and patient can steady his patient and assist the weak organ to do its work. He cannot cure the leaking heart, but he can stay the mental trepidation, which means more frequent and more painful periods of palpitation. And this is what the patient wants—he judges by symptoms.

DOPE FIENDS OF ONE CITY

Jacksonville, Florida, has an ordinance requiring that drug users shall register with the department of health. Druggists, physicians, and other dealers and dispensers are allowed by law to sell the needed drug to a person registered as a dope user.

The purpose of the Jacksonville authorities was to concentrate their efforts on the prevention of the habit. In order to get a record of drug users, their number, the drug used, the amount, the reason for the habit, and other items concerning them for careful study, they passed and are enforcing this ordinance.

The Tennessee legislature made a similar measure into a state law. The Tennessee law is enforced by the state food department.

Dr. Terry, the efficient Health Commissioner of Jacksonville, reports that of the total population of that city drug users compose about 1.5 per cent. The percentage of drug users among grown people is much higher than that. These are distributed by color and sex as follows:

White males	32.69	Total males	43.74
White females	36.98	Total females	56.26
Colored males	11.04	Total white	69.67
Colored females	19.28	Total colored	30.33

The population of Jacksonville is about equally divided into white and colored. It will surprise some people to know that white people, as compared with colored, are more than twice as liable to become dope fiends. This does not hold true of cocain. Negroes are especially prone to use cocain.

There are a few more women than men in Jacksonville, but this disproportion is not as fifty-six to forty-three. The conclusion is that women are somewhat more disposed to use dope than are men.

Please Do Not Ask Us

What is { ANY OLD / PATENT / MEDICINE } **Worth?**

For you embarrass us, as our honest answer must be that

It Is Worthless

If you mean to ask us at what price we sell it, that is an entirely different proposition. When sick consult a good physician. It is the only proper course; and you will find it cheaper in the end than self-medicine with worthless "patent" nostrums.

The report from State Food Commissioner Brown of Tennessee is that the proportions between female and male addicts and white and colored are about the same in that state as in the figures given by Dr. Terry for Jacksonville.

An analysis of the replies given by 250 users as to how they started is as follows:

Prescriptions of physicians	48.8
Through dissipation	30.4
Through advice of users	18.8
Chronic and incurable diseases	2.

Investigation on this point did not go back of the reply returned on the blank. For instance, how many of the 48.8 per cent. who put the blame on prescriptions of physicians made a misstatement to cover their own shortcoming is not known. Nor is it known how many cases were due to indefinite refilling of prescriptions or counter-prescribing, and how many were due to physicians' prescriptions, so considered. Indirect causes given were in the order named, rheumatism, pelvic inflammation, accidents, headaches, surgical operation, stomach trouble. About 15 per cent. of the dope fiends were prostitutes.

Dr. Terry thinks that every community should provide a free sanitarium for the cure of the drug habit as well as enforce laws to prevent it.

DOPE LAW WEAKNESSES

The Treasury Department began the enforcement of the Harrison law on March 1, 1915. While this bill relates to the purchase and sale of opium and

coca leaves and preparations made from them, it is capable of being made a national measure for the control of drug habits, being limited, however, to the opium and cocain habits.

Under rulings made by the commissioner of internal revenue the law, properly enforced, will make it impossible for any drug habit victim to get an adequate and continuous supply of his drug. It therefore will force the drug habit victims to be cured.

The law, properly enforced, will be highly effective in preventing people from being drug addicts. Prescriptions containing opium and coca preparations cannot be refilled and records of the purchases of drugs must be kept. These provisions are calculated to prevent the formation of habits.

However, there are two weak points in the law. Physicians, dentists, and veterinarians who register as such are allowed some leeway. Up to date, applicants have been permitted to register as physicians, dentists, and veterinarians without being required to make proof that they were such. Nothing is easier than for the collector to require each applicant to show the license granted him by the authorities of his state.

The Commissioner of Internal Revenue writes: "It devolves upon the collector of internal revenue to see that no other persons [than legal practitioners of medicine, dentistry, and veterinary medicine] register under this law."

This weakness in the law, as it has been administered up to date, is purely one of administration. It lies within the power of the department to purge the lists of any improperly registered, to supervise those who are properly registered, and to require legal proof of right to practice as a requisite to registration.

The second weakness is far more important. Section 6 of the law prescribes that patent medicines containing opium and cocain do not come under the law. If an ounce of the patent medicine contains less than two grains and a fraction of opium, or one-fourth of a grain of morphin, or one-eighth of heroin, or one grain of codein it may be sold freely without any of the limitations imposed by this law.

These are not inconsiderable strengths. For instance, this law would not prevent a man from buying a ten-gallon jug of paregoric without having any record made of the purchase. Section 6 makes easy the formation of habit.

The law as a whole is an excellent measure against self-drugging. At the point where the need is for great strength we find this fatally weak section. It is a crawfish hole in the levee.

Section 6 did not get into the law by accident. The patent medicine people put it there. While it was not their purpose to make drug fiends of people, they were quite willing to be the beneficiaries of the provision which makes drug fiends.

It is possible that the Pure Food and Drug Act of 1906 or the Sherley Law of 1912 or state and local laws may be so administered as to cover this point of weakness. So far as this law is concerned the only remedy is to amend it by striking out Section 6.

WHAT IS THE DRUG FIEND TO DO?

On March 1, 1915, the Harrison bill went into effect. It is a federal law and, therefore, applies in every part of the United States. The federal government has a way of enforcing its law. Furthermore, drugs are in the hands of druggists—a law-abiding class. All in all, the chance that the law will be enforced is excellent.

Section 1 gives the Commissioner of Internal Revenue, with the approval of the Secretary of the Treasury, the right to make rules and regulations for carrying the provisions of this act into effect.

Section 2 requires that no drug of the kinds specified in the law shall be sold to anyone except upon a written order, said order to be on a blank provided by the collector. The collector has ruled that blanks shall not be issued to addicts.

The person who has a drug habit nowadays can get his supply through physicians only. As a means of getting a supply this will prove unsatisfactory. Some physicians will be careless. Some will be worse than careless. The great majority will refuse to act as mediums for the evasion of the law.

There are more than a million opium and cocain users in the United States. What can they do?

Some have made more or less permanent connections with improper sources of supply. Physicians, dentists, and veterinarians tempted to supply drugs to addicts, whether impelled by cupidity or weakness, should bear in mind that the federal government is strong and compelling.

North Carolina State Health Department.

FIG. 143.—PENNY WISE AND POUND FOOLISH. Headache Medicine.

Some addicts have found temporary supplies to tide them over a brief period.

Some have undertaken cures. They will find it easier to break off than they thought. Cures are fairly satisfactory. They will be doubly satisfactory now that relapsing is to be a difficult matter.

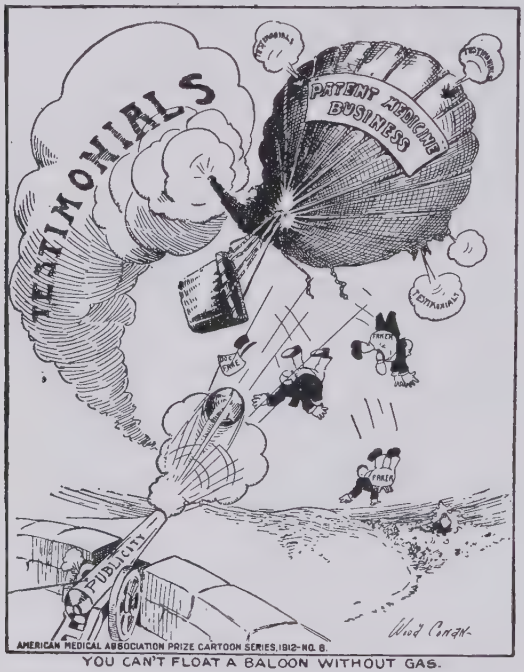
It is common knowledge that some criminals are broken of their habits by short jail sentences. Deprived of their drug, they suffer severely for a few days and moderately for a few weeks, but at the expiration of their sentences they go out freed of the habit. As they are, generally speaking, neurotic or feeble-minded, they relapse. But the jail experience has proved that breaking off is not so unpleasant as was expected.

Perhaps now that a strong government proposes to act in lieu of a strong will the cures may be without relapse.

MORPHIN CURE

A ruling by the Commissioner of Internal Revenue shuts off drug users from their supply. Evasion of a federal law is a risky procedure. Taking the cure is painful and troublesome, but settling with the federal authorities is worse and more of it.

There are hundreds of thousands of drug users. In the entire country there are not 5,000 beds available for cures for drug users. Those who can do so should go to institutions. Taking the cure outside an institution is far more risky and far less satisfactory than inside one. But where the number of institution beds is so small and the number of those in need is so large many must be cared for in private homes under the close care of physicians and nurses.



YOU CAN'T FLOAT A BALOON WITHOUT GAS.
North Carolina Health Bulletin.
FIG. 144.

In view of this situation an article by Dr. W. K. McLaughlin in the *Chicago Medical Recorder* for February, 1915, is useful. We give his statement of the Towns morphin cure method:

"Start Sunday morning at 8 A. M. Give five compound cathartic pills and five grains of blue mass. At 2 P. M., unless the bowels have moved freely, a dose of salts is given. Some time during the middle of the afternoon, the bowels having moved three times, the patient is given two-thirds his total daily dose of morphin. It is given by mouth or by hypodermic as the patient wishes.

"The amount of the drug is divided into three parts. One-third is given at, say, 3 P. M., one-third at 3:30. Unless the patient is fully under the influence of his drug he is given the last third at 4 P. M. At 4 P. M. he is given six drops (not minims) of the following belladonna mixture: Tincture of belladonna (15 per cent strength), 2 ounces; fluid extract of xanthoxyli, 1 ounce; fluid extract hyoscyamus, 1 ounce.

"Give six drops of the belladonna mixture at 4, 5, 6, 7, 8, and 9 P. M. Then increase the dose to 8 drops and give one dose every hour until 3 A. M. Then increase to ten drops and give every hour until 9 o'clock Monday morning; then twelve drops every hour until 3 P. M., then fourteen drops every hour until 9 o'clock Monday night; then sixteen drops every hour until the throat becomes very dry from the belladonna.

"This is dangerously powerful drugging and it should not be undertaken except under close observation.

"Ten hours after the first dose of morphin (about 1 o'clock Monday morning) give five compound cathartic pills and five grains of blue mass. At 9 o'clock Monday morning give a dose of salts unless the last cathartic has acted freely. When the bowels have acted freely—say about 5 o'clock Monday morning—give the second round of opium. Half the amount given on Sunday afternoon is the amount to be given. It is divided into three doses. These are taken at 5, 5:30, and 6 o'clock Monday morning.

"Ten hours later, say at 4 in the afternoon, five compound cathartic pills and five grains of blue mass are given. After these have acted thoroughly, say about 10 at night, a third dose of opium is given. The amount given should be one-sixth the twenty-four-hour quantity used by the drug user. The next morning (Tuesday) at 6 o'clock five compound cathartic pills and five grains of blue mass are given. At noon a dose of salts is given. About 4 o'clock in the afternoon two ounces of castor oil is given.

"In most cases the belladonna can be stopped on Tuesday night. During Tuesday it is necessary in some cases to give a simple sedative. Care in diet and good nursing for several days after Tuesday are necessary."

We repeat the advice given at the beginning of this article.

SCELETH DRUG TREATMENT

During the last fifteen years the hospital connected with the Chicago House of Correction has treated 3,000 cases of drug addiction, in the main, morphin. Since the need for a cure is so great and so immediate just now, we give the treatment employed by Dr. Sceleth.

The patient upon arrival at the hospital is given a full saline purge. The medicine used as a bracer during the period of drug hunger is composed as follows:

Scopolamin hydrobromid	gr. 1-100
Pilocarpin hydrobromid	gr. 1-12
Ethyl morphin hydrochlorid (dionin)	gr. ½
Fluid extract cascara sagrada	M. 15
Alcohol	M. 35
Water q. s.	Ad 1 fl. drachm

If the patient was accustomed to taking more than ten grains of morphin a day he is given of this mixture sixty minims every three hours, night and day, for six days. On the seventh day the dose is reduced to thirty minims; on the eighth, fifteen minims; on the ninth, fifteen minims three times a day instead of every three hours. On the tenth day the mixture is discontinued and one-thirtieth of a grain of strychnin nitrate is given three times a day. On the eleventh day and for six days thereafter one-sixtieth of a grain of strychnin nitrate is given three times a day.

If the patient used less than ten grains of morphin a day the doses of the mixture should be one-half those given above. If he used less than five grains he can start with fifteen minims of the mixture.

The use of the remedies must be varied somewhat, according to the

patient. The best policy by odds for a man who must continue the use of a drug is to go to a sanitarium for a cure. If for any reason this is not feasible he can succeed in a fair proportion of cases under the care of physicians in his own home.

When the drug is withdrawn from a cocain addict he goes crazy. His insanity lasts a few days and then his mind clears. Cocain users need restraint above every other element of cure.

Heroin addicts generally suffer from something of the same quality of mental degeneration. Watching and restraint are very necessary with them.

In handling morphin and codein users drugs are more important and restraint is somewhat less so. Dr. Sceleth says that when the morphin dose is more than ten grains a day close medical supervision is required and that at the best some will die.

Commissioner Brown of Tennessee says that the average daily dose of morphin of the morphin addict in that state is 8.8 grains.

These drug cures are for drug hunger. After the cure comes the need for mental and moral training.

Do Not Take Morphin.—*H. H. writes: "The writer is troubled with wakefulness for two or three hours every night just after going to bed. Usually I drop into a deep, unbroken sleep after that until about 6:30* A. M. *I retire usually at 10* P. M. *or thereabouts. It often seems, no matter how late I retire or how dead tired I may be, I must lie wide awake till sleep finally comes on. I do not wish to take too extreme measures, but would you recommend morphin or opium cigarettes, as I would be rid of insomnia at any price?"*

REPLY.—You do not go to sleep until you relax mentally. You must stop working after supper, or whatever else keeps you keyed up. After supper take a walk with some agreeable companion, talk about incidental things, then play cards for a while, or read something which interests you but entirely apart from your day's work. Sometimes a hot bath before retiring helps. Don't worry. Worry means mental tension and that means insomnia. But as you value your future, take no morphin or any other sedative.

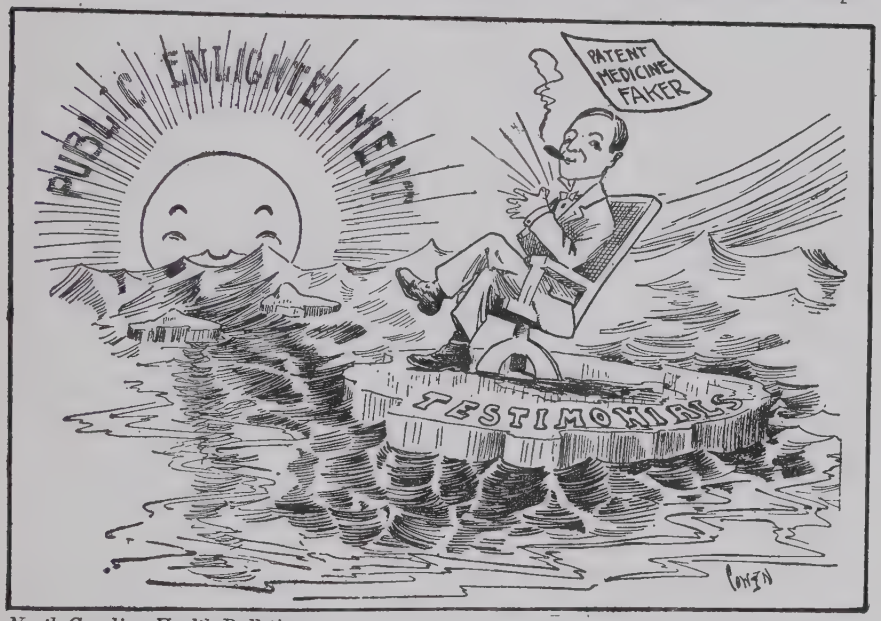
Drug Habit Danger.—*F. A. C. writes: "If a strong young man insists on taking quarter-grain codein tablets at the constant rate of two or three daily, is there any danger of this excessive use of them proving fatal? How long could an ordinary heart stand six or seven grains of codein a week? What, if any, bad effect would antikamnia-codein tablets have, to replace the plain codein? He takes the tablets for headaches, caused, I think, by too much eye work, and insists they are not harmful."*

REPLY.—Probably they would not prove fatal, and certainly not by paralyzing the heart. But the man will soon become a drug fiend and drug fiends shortly become so inefficient, incapable, and usually so immoral that life is not worth living. Antikamnia and codein tablets are liable to produce the drug habit. However, they are more certain to produce constant headaches. They poison the nerve cells and the blood cells so that they bring about the condition they are supposed to cure and that they do sometimes relieve.

Morphin Habit.—*C. C. writes: "Do you think it possible for a person taking from two and a half to four grains of morphin sulphate daily to overcome this habit?"*

REPLY.—I do not think it possible. The morphin habit is a worse disease than the whisky habit. The person should go into a good institution prepared to stay long enough to get built up. Drug users are usually neurasthenics and they need mental and nerve upbuilding.

Must Give Up Morphin.—*Mrs. M. C. C. writes: "During an illness and afterward for insomnia, a doctor prescribed morphin. Since then I have been unable to sleep without it. One-eighth of a grain will insure sleep*



North Carolina Health Bulletin.

FIG. 145.—SUNLIGHT.

for two nights. Kindly inform me if this dose will harm me and what will be the effect on my system? Can I effect a cure at home? I am a woman past middle life."

REPLY.—You are taking a small dose. Nevertheless you must stop it. You will have no difficulty in curing yourself. Eat sensibly; take a purge; repeat in a day or two. Take a warm bath at night; stay in the bath long enough to get quiet. Remember that it makes no great difference whether you sleep or not as long as you worry and fret. Go to bed and sleep if you can, or stay awake if you must, but do not worry.

Bars Morphin Users.—*R. W. writes: "I have three friends who are more or less addicted to the use of morphin, and they fear the humiliation of exposure when the new law goes into effect on March 1. What should they do?"*

REPLY.—The Commissioner of Internal Revenue has ruled that drug users shall not be allowed to buy the blanks necessary for the purchase of drugs.

Your friends should take a cure. They should have all the moral support their friends can give them during the period of readjustment after the cure.

Sleep Caused by Drugs.—*F. B. N. writes: "What is the effect on a person who for years takes from seven to ten grains of veronal every night to produce sleep? Is it harmful to the system in any way?"*

REPLY.—It is. It is better to lie awake than to get sleep from drugs. Have your physician discover why you do not sleep and then teach you mental control so that you can sleep.

See Doctor First.—*H. K. writes: "I was once upon a time troubled with insomnia. A doctor prescribed sleeping powders for me to take at bedtime about every third day. Would it be advisable for me to take them again, perhaps twice a week? Could they do any harm to the heart or any other organ of the body?"*

REPLY.—Do not take sleeping powders on your own account under any circumstances.

Don't Take Soporific.—*M. E. S. writes: "When I work hard I cannot go to sleep for from two to five hours after I go to bed. I have been taking veronal. Is it dope? Shall I form a habit? I am a woman of 67."*

REPLY.—1. Veronal is not dope in the sense that the word is generally used. Its use is not regulated by the Harrison Drug Act. At the same time my advice is that you do not use veronal to produce sleep. It will not help you, but will harm you. This statement holds true of every medicine used to produce sleep.

Be quiet after sundown, and you will sleep as much as you need to. Eat a light supper.

A woman of 67 does not require much sleep. If she will retire quietly after a quiet evening, determined to be content with whatever comes in the way of sleep, she will find that sleep will arrive.

Don't Take Bracers.—*G. T. writes: "I understand nux vomica is a good stomach and nerve bracer. Will strychnin tablets give the same results? Same thing, isn't it? What's the dose? Are caffein tablets as good a stimulant as coffee?"*

REPLY.—1. The effect is about the same. One-sixtieth grain.

2. Yes.

Let me advise you as emphatically as I can not to use nux vomica, strychnin, or caffein, or any other drug as a stomach and nerve bracer.

Heroin Derived from Opium.—*A correspondent sends us a clipping from a Pittsburgh paper in which it was stated that the school children of that city were becoming addicted to the use of heroin. The correspondent wants to know what heroin is.*

REPLY.—Heroin is derived from opium. It is as dangerous and as prone to cause a habit as is morphin.

An Opium Fiend.—*H. L. M. writes: "Will you kindly write of the effects of codein upon the system and character of a person who uses codein tablets at frequent intervals to quiet pain."*

REPLY.—Codein is derived from opium. Its effects are not very different from those of morphin. To make matters worse a good part of the

codein on the market contains a considerable percentage of morphin. A codein addict can figure that he is an opium fiend.

When to Use Codein.—*Anxiously Waiting: "A nurse wants to know why codein is frequently combined with morphin in prescriptions."*

Reply.—There is no reason. It would be wiser, when morphin is needed, to give it in its proper dose. Codein is derived from opium, as is morphin, and has about the same effect.

Starts Drug Habit.—*M. G. writes: "Will you please tell me whether common baking soda, taken frequently for distress in the stomach, is harmful?"*

Reply.—It is. It begets a drug habit. It makes the original condition worse. It substitutes an improper curative method.

Relief—a proper one—removal of the cause.

Drug Habit Effect.—*A. F. G. recites the story of a painter arrested for stealing. The defense of the man was that for eight years he had been a drug fiend, using morphin, cocain, heroin, and aspirin. A. F. G. wants to know if the use of aspirin would cause the effects claimed above.*

Reply.—Any drug habit will cause moral degeneration. Cocain is especially effective in this way; so is morphin. Aspirin also causes a habit. However, the probability in this case is that cocain and morphin are responsible.

COCAIN FIENDS

There is no excuse for the cocain habit. Cocain has no place in medicine and but a limited place in surgery. Any discomfort relieved by cocain will be worse in three hours than it was before cocain was used. When a team is laboriously dragging a wagon uphill, from time to time the driver will "scotch the wheel" to give his team a chance to catch their wind. Some medicines "scotch the wheel" to give nature a little resting spell. Not so cocain.

Any man who uses cocain to relieve any discomfort or allows it in any proprietary or patent remedy used by him or allows any doctor to use it on him is just an everyday fool. A surgeon may use it to remove a cinder or to operate on an eye or nose, but that is no reason why a patient should use it or allow it to be medically used. The only excuse for the cocain habit that has any standing is that the subject is a neurotic and if he does not do one half crazy thing he will do another. Developed "coke" fiends are willing enough to admit this as the reason for their habit, but no potential "coke" fiend would care to offer it as a reason for taking the drug.

There is more deliberation, even what we might call malicious intent, or weak, wabbly, neurasthenic indecision about cocain addiction than there is about opium or alcohol use.

Many take opium because they have not the grit to stand pain, and they fail to recognize where they are going. Most cocain fiends know well enough where they are headed for, or think they do, but their miserable,

poor-working minds tell them it is better to fly the ills they have and take what comes.

The cocain fiend, when in his drug, is able to forget, and that is about all that can be said in its favor. There is none of the grandeur of alcoholism or the dreams of morphinism or the fantasies of hasheeshism. No literature or anything else has ever been produced by the "coke" in his drug. He is negative, that's all. Deprived of his drug he is as free from any conception of rights of property and morality as is the opium fiend and nearly as free from any conception of the right of life as is the man suffering from acute alcoholism.

Therefore, whether you look on the one side or the other, the "coke" addict does not present an attractive picture.

We quoted Dr. Crothers as saying that one-third of the opium is used for legitimate purposes. Not one-thirtieth of one-third of the cocain is so used.

What can be gained by warning against the careless use of cocain is small, as compared with the use of morphin. Nevertheless, some people get the habit through carelessness. Asthmatics and hay fever sufferers are in some danger. Snuffs, sprays, and cures sometimes contain cocain. Occasionally a physician will prescribe it.

Again—no circumstances warrant the medical use of cocain. Its surgical use is never warranted, except for a definite operative procedure.

Can a cocain fiend be cured? Yes, it is one of the easiest of all habits to cure while under treatment. The method is as follows:

Confinement is necessary. The man deprived of his cocain will probably become delirious. He may become maniacal and definitely insane. He may develop a tendency to run amuck and kill and destroy. He must be under close, compelling control. He should have very free, in fact excessive, purgation. For his nervousness he may have morphin or other sedatives at the discretion of his physician. After two or three days the drugs will be out of his system. He will be freer from craving for drug than the man just cured of the alcohol habit or the morphin habit.

The cocain fiend is the craziest of all fiends when his drug is first withdrawn. He loses his craving quicker than does any other fiend. But, alas, he is most apt of all fiends to resume his habit.

He was a neurotic before he began the use of the drug. Having been cured of his drug habit, he is still a neurotic. He is very apt to dig up an excuse for again becoming a fiend.

Cocain Habit.—*W. O'D. writes: "1. Is there any cure for the cocain habit? 2. Is a person so addicted and having a violent temper liable to do anyone injury? 3. Kindly give me the name and address of a journal on nervous diseases."*

Reply.—1. Yes; sanitaria for the cure of drug habits cure the cocain habit sometimes. Of all habits it is about the most difficult to cure permanently.

2. Yes.

3. *Journal of Nervous and Mental Diseases,* published in New York City.

Do Not Use Cocain.—*Miss C. writes: "In your article on insanity last*

Sunday you referred several times to cocain. I am troubled with hay fever, and for a number of years I have been taking treatments each season from a physician who uses each day a spray in my nostrils containing cocain. He also gave me some to take home, to use when my 'nose is stuffed.' He did not tell me it was cocain until I asked him as I had heard it was harmful, and I found I had to use it more often each year, and on dusty days as well as during the hay fever season. The doctor assured me there was no harm or danger so long as I used the 'pure drug.' He said there is no such thing as the 'cocain habit.' It is the 'morphin habit' that is bad. He says anyone can easily stop using cocain if he wishes to. Are his statements correct? The spray is so soothing that I do not wish to stop unless it is harmful."

REPLY.—The most dangerous of all habits is the cocain habit. Do not use cocain regularly, regardless of who tells you to. Stop the spray.

THE ALCOHOL HABIT

The alcohol habit is much more appealing than the other habits. It narcotizes certain adverse impulses, puts "bogies" to sleep, and infuses "Dutch courage." There are certain mental attitudes and certain types of mind that are harmonized into greater effectiveness by it.

While I cannot see why cocain should tempt anyone, I can understand why even a fairly smart man could be lured "into the marsh" by alcohol. It is much easier to escape its clutches than it is to get loose after opium has you. This point is no mean factor, as a large part of the "addicts" genuinely feel that they can break away when they get ready. Some of them do. Most of them could, but they never get ready. Some of them suffer from an egomania due to alcoholism. Their drink makes them weak minded, and, at the same time, gives them an exaggerated idea of their power over themselves.

A man with the alcohol habit is a sick man, however much he may think to the contrary. He is mentally sick. He may have inherited a mental make-up which makes it strongly probable that he will be a drunkard, or it may be the fault of bad social training. Usually, however, the disease develops as the result of what it feeds on. The man's mentality becomes perverted through chronic alcohol poisoning.

Alcohol has fuel value, but no food value. Its poisonous qualities overshadow its fuel value. It has no toxin neutralizing power. It is no longer used by well informed people for snake bite, or consumption, or blood poisoning. Where it is a question of keeping a person alive for, say, four hours in some crisis disease, its use may be justified, but to keep a patient upon it for days or perhaps weeks in typhoid or pneumonia is unwise. Even as a stimulant, aromatic spirits of ammonia is better.

There is mighty little, if there is any, place for alcohol in medicine. But alcohol as a medicine is not an important source of drunkenness. Drunkards are made by the drink which is taken because it makes one feel good.

The harm of addiction to headache powders is pretty nearly limited to the habitué. Alcohol is different. A pebble dropped into the water causes a ripple that affects the entire mass. The alcohol habit ripples out, affects

the family, and then society. The crimes of alcoholics are crimes against society.

The drug end of cures does not amount to a row of pins. Just as whisky affects the mind of the drunkard and the lives of those around, the cure of the habit is mental and social. The drug end of "jag" cures is a minor detail. The items which count are suggestion and mental training followed by proper, continuous, and sustained social help.

WHISKY AND HEAT

The scene was a sleeper on a Frisco train between Memphis and Birmingham. It was 11 o'clock on a hot morning in June. The thermometer had registered over 90 for several days. A fairly fat passenger sat in the smoking compartment. He was in his shirt sleeves. By taking things easy he managed to keep fairly cool. When the train stopped at Tupelo he bought a lunch from a basket.

"Do your sandwiches contain a whole chicken apiece?" he asked.

"Some of them have a half chicken," was the reply.

"Then give me one with half a chicken in it."

He bought his lunch and returned with it to the smoking compartment.

The "butch" came along and sold our fairly fat friend a bottle of a non-alcoholic beverage. He opened his grip; took out a full quart of whisky; poured three fingers into a cup; filled the cup with the purchased beverage, and drank it down. He offered me a pull at his bottle. I declined.

He ate his lunch, including the half a chicken. Then he began to sweat, and the sweat fairly rolled. In half an hour he was as hot as a broiled lobster, and as wet as a dishrag.

Now, why did he do it? He was not on a jag. He did not have a "still on." His mind was as clear as a bell. He knew what he was doing. It was not sociability, or to be a good fellow, or to be swagger. He did it because it was coming lunch time and he was of the opinion that a nice little drink and a lunch would make him happy, comfortable, and contented. His judgment was poor, and he paid the price.

To drink whisky on a hot day is like throwing kerosene on a fire. Within a few minutes the whisky was circulating in his blood and burning to form heat. Furthermore, it was sending the blood into the skin, and an excess of hot blood in the skin makes one feel hotter than he is. Whisky cannot make anything but heat and energy, and, when a man sits quietly in a sleeping car, all of the whisky goes to heat. Then he added the meat lunch.

There are those who claim that the act of digesting makes heat. The best opinion seems to be that, while the act of digestion does not of itself produce heat, in the process of digestion foods, especially meats, immediately liberate some heat. At any rate, after eating the amount of heat made by the body increases.

This man had to spend some hours in that hot car. He should have figured on how to keep cool. He could not get any exercise except the exercise

of breathing, sitting up, and a few similar acts. He needed little food to repair waste. He certainly needed no whisky.

Had he been a man of good judgment he would have gone without his noonday meal or eaten an apple or orange and drunk a lemonade. He would have drunk about six glasses of water between breakfast and supper. By following that plan he would have had a comfortable ride.

RULES FOR GETTING DRUNK

Mike, my Italian fruit peddler, told me some time ago that when the former mayor of Chicago was defeated at the primaries he, Mike, celebrated by getting drunk. He said, furthermore, that if a certain candidate were elected in April he proposed to celebrate that victory by getting drunk. He had already put aside ten dollars for the purpose.

If a fellow feels that he must get drunk he might as well go about it in the right way. The early spring is a bad time to go at it in the wrong way. Pneumonia is liable to follow a March-April drunk, and the natural sequence of drunk pneumonia is death.

Now, the Mikes I know are good people. Their families need them, and I need a fruit peddler. Therefore I am going to lay down some rules for planned drunks.

He should prepare for a drunk by taking a purge.

He should not get drunk when he has a cold. It is not safe to go on a drunk even if the aching stage of the cold has passed and nothing is left but a hard cough.

He should rest up for a day before starting in, or, to put it another way, not get drunk when tired. Great fatigue lowers resistance against the pneumonia germ, and one resistance lowerer is as much as a man should stack up against.

He should eat from time to time while he is drinking.

He should drink only in clean, well-ventilated places. *To hang around a hot stove in a close room with a sawdust sprinkled floor, drinking booze, is to hang out the "Welcome" sign to pneumonia germs.*

Before his brain quits working he should arrange a place in which to spend his unconscious period. It should be a cool, well-ventilated room. It is necessary that he should not be chilled through, and therefore he must provide bedclothes enough. It is just as necessary that he should not be overwarm; therefore he must raise a window.

He will save inconvenience and trouble and lessen his danger if he will vomit before he falls off. The disposition will be present. All he needs to do is to let it come up.

When he wakes up he will have a headache, a dark brown taste, and a dry cough. His first act should be to take a purge; a second dose within that first twelve hours is advised. One should be a dose of calomel or some compound cathartic pills; the other can be a saline. He should drink freely of water, carbonated and plain. He should take one dose of headache medicine. This should not be repeated.

It is time now to take some nourishment—a glass of milk, a cup of clam broth, and a cup of coffee; then a package of chewing gum.

He should wrap up well and get some exercise in the open air.

He should take no medicine for his cough. When the purge acts well his cough will go.

He will feel "all shot to pieces" and his natural impulse will be for a bracer. The bracer he craves may be ale or sour beer or whisky. He should cut out his bracer. A cup of coffee or a pint of milk will serve him better.

Periodic Drinkers.—*S. B. writes: "I have a friend 30 years old who is a periodic alcoholic. He has taken two liquor cure treatments, but was relieved for only a short time. The attacks, which at first were several months apart, are becoming more frequent. What is the best treatment for this trouble?"*

REPLY.—There is nothing left to try but religion. A strong dose of that may save him. Periodic drinkers are mentally wrong. These cures nauseate and disgust and then clean out the alcohol, which steps simply clear the decks, clean off the ledger, or any other way you want to put it. Then comes the real treatment in such cures. It is applied psychology or the use of fear, shame, disgust, hope, family love, pride, and finally determination and grit. What is being worked out is training of will. Often the combination succeeds; often it fails. If a man is capable of being powerfully gripped by religion, he can shortcut quickly from condition to cure. If a man is so made up mentally that he cannot be reached in any of these ways, he cannot be cured. Some day the community will permanently detain the incurable periodic alcoholics.

Whisky and Alcohol.—*M. H. F. writes: "A few weeks ago I was called to the country to see a patient whom I found in a state of collapse. I felt the necessity of using an alcoholic stimulant in the case, but had neither whisky nor brandy with me. I had, however, a small bottle of grain alcohol and used that properly diluted. A few days ago the question arose as to whether the use of diluted alcohol by an habitual drinker would be more harmful than the same amount of whisky, the percentage of alcohol being the same. I find that the impression, even among the medical men, is that alcohol, no matter how pure it may be, is much more harmful than good or even common grades of whisky. What is your opinion?"*

REPLY.—Alcohol diluted to the percentage of the alcohol contained in whisky is no more harmful than whisky. The alcohol contained being the same, the effect for the various purposes is only a matter of quantity.

Aromatic spirits of ammonia is generally used now for a diffusible stimulant rather than whisky or other forms of alcohol. Emergency kits and ambulance and hospital equipments have nearly all been changed in this particular.

Drink Habit.—*Mrs. J. G. S. writes: "Is the drink habit a disease, and can it be cured by some treatment which can be taken in the home? If not, what treatment would you advise?"*

REPLY.—It is a disease. Sometimes it can be cured at home. Frequently, it is necessary for the patient to stay in an institution until he has got his nerve back. Most drinkers are neurasthenics and need some mental upbuilding to be cured so as to stay cured.

Cures for Liquor Habit.—*E. R. writes: "I am 32 years old and a heavier drinker than I care to be. Do you advise the Keeley cure, the Neal Institute, or the Gatlin cure? What is the difference in treatment of the three? Are there undesirable physical effects, or any physical effect other than the quenching of a thirst for alcohol?"*

REPLY.—As these treatments are secret, it is impossible to answer several of your questions authoritatively. My opinion is that the basis of practically all treatments is to stimulate elimination and to provoke nausea or disgust with alcoholic beverages. To do this drugs are employed. After these ends have been accomplished the next step is to build up the determination to quit. I am sure this important part of the treatment is psychic. Therefore residence in an institution where one is thrown with people who are determined to get well and who are getting well is of great advantage. The longer this psychic treatment is continued the surer are the results. I do not believe there are any harmful or undesirable physical effects.

SMOKING

The use of tobacco does no good. Therefore, there is no reason why any person should plan to use it. Used in small amounts by grown persons, it does no harm, and, accordingly, there is no reason why any adult should not use it in moderation if he so desires. It is just as useless and just as harmless to women as to men, and, therefore, there is no physical reason why women should or should not use it. There is no more logic in different tobacco standards for the sexes than there is in different morality standards.

Heavy users of tobacco excrete it from all parts of their bodies. This means that every cell in their bodies is bathed in the products of tobacco. The cells of matured tissues will stand a great deal of this, and for a long time, before plainly diagnosed harm is apparent. The tissues in which harm is most apparent are certain nervous elements.

Tobacco blindness is due to degeneration and final destruction of the optic nerve. Tobacco heart is a term applied to a heart which is irritable. It is the result of degeneration of the heart nerves.

Tobacco juice in the mouth is not an antiseptic. It does not kill germs nor keep the tonsils or teeth clean. The same is true of tobacco smoke.

Tobacco users are usually spitters, and thus, indirectly, harm is done.

There are those who believe that they can sit down and think more deliberately and with better judgment when smoking than when they are not. There is nothing in the effect of tobacco which is responsible for this difference. It is suggestion, a psychological phenomenon. Nevertheless, to them it is a fact which cannot be questioned.

There is no more harm in cigarettes than cigars or pipe tobacco. In the main, the tobacco in cigarettes is not of a high grade. No chemicals are mixed with it except a small percentage of glycerin. As it is a light smoke, there is a greater disposition to inhale than when cigar or pipe smoking is indulged in.

The main objection to cigarettes is that they especially appeal to boys with immature, impressionable tissues and with habits in the forming. There

are very grave objections to the use of tobacco by children and youths. This forms the strongest argument against cigarettes.

This is about as judicial a weighing of the tobacco question as we can write. Young people should not smoke. Cigarettes should be discouraged, because of the moral effect on young people.

Women have as much right to smoke as men. There is no reason why anybody should smoke. There is no reason why the average adult should not smoke if he wants to.

When a smoker is becoming nervous or has an irritable heart or is going blind he must stop or pay the penalty.

Tobacco and Capacity.—*Dr. D. S. Hager writes that Dr. Evans has not studied the tobacco question, else he cannot understand why he, as a physician, is not absolutely opposed to it. The immediate effect is nausea, vomiting, depression, and sometimes unconsciousness. The chronic effects are high blood pressure, arteriosclerosis, and sometimes apoplexy. Dr. Carjaval has written a book telling of the harm which tobacco does to Mexican youths. This book, issued by the Interior Department of the Mexican government, was recently reviewed in the* Journal of the American Medical Association. *He says that the habit is acquired through example, and no man should lightly do that which his neighbors will ape him in to their detriment.*

Reply.—There is truth in Dr. Hager's criticism. Any man who steeps himself in tobacco will be harmed materially. The man who takes a moderate amount will be harmed a little.

Athletes in training are never allowed to use tobacco. No man who expects to be called on to use 100 per cent of his capacity is justified in using tobacco. The athlete making a jump which requires all his muscle power should not use it. The runner who is going to use up every ounce of stamina in a mile race should not touch it.

Ordinarily, however, heart work, kidney work, muscle work is done on about 10 per cent of capacity, and 90 per cent is held in reserve—the principle which has been economical in the use of boilers.

For the purposes of the man who is running under low pressure the moderate use of tobacco does no harm. To work under high pressure is worse than using tobacco.

Whenever disease has knocked down capacity until the margin of reserve is about used up tobacco in moderation is harmful. The point about example is well taken.

Not Justified in Smoking.—*N. S. C. writes: "Will you kindly write about the ill effects of cigarette smoking, especially upon a man of 25, broken down in health after an attack of pleurisy two years ago and then sent to Colorado, where the lungs improved? When better he resumed smoking cigarettes against his physician's advice, and has great throat trouble now. Is very thin, only weighing 120 pounds, though six feet tall. His father died of tuberculosis. He has a wife. Does not drink and has ability to work; only needs health. Cigarette smoking is undermining this."*

Reply.—A moderate amount of cigarette smoking does not materially harm a full-grown man in good health and living well within his physical

powers. If it gives him pleasure the harm done will not be enough of a disadvantage to offset it. But cigarette smoking does harm to:

Boys and young men who have not attained their physical stature. Particularly does it harm adolescents.

Athletes or anyone who must at times use his heart muscles or other muscles to their full capacity.

Nervous people, particularly those with nervous hearts.

A man who has broken down from pleurisy, weighs 120 pounds, and is six feet tall, has had to go to Colorado for his lungs, who has a tuberculous family history, is not justified in smoking.

Giving Up Tobacco.—*Repentant writes: "I am 66 years old and in fairly good health. I was married at 20. I have chewed tobacco ever since I was 21. I smoke a pipe a great deal. My wife, a refined woman, has always seriously objected and felt I wronged her and the babies by polluting the air they were compelled to breathe, and she has felt disgust for kisses from tobacco lips. In fact, tobacco has seriously marred our otherwise happy life. My daughters feel humiliated and ashamed of their old dad, and I am ashamed of myself, and would like to do one decent thing before I die and quit. Can I quit with safety? Will it impair my health or shorten my life? I want to quit, but am afraid my will power will not carry me safely through. Is there anything that will help me? Do I need a tonic? How long will it take to get the nicotin out of my system? Will my brain ever be as clear and quick as though I had not used the 'weed'?"*

Reply.—1. Yes.

2. No. Assuming that you are a tobacco fiend, continuing your habit may impair your health and shorten your life. Stopping will not. Those habit cases which show impairment after stopping were impaired by the drugs and not by the absence of them.

3. All habit cures operate through the mind. You will succeed, if you have confidence in your success and determination enough to put up with the inconvenience while you are ridding yourself of the habit.

4. Your physician must decide that.

5. Practically speaking, you will have the "nicotin" out of your system in, say, three days. It will take some weeks, say two, for your poisoned nerves to get back their normal chemistry. You will be months getting your habits readjusted on a non-tobacco basis.

6. The good effects of tobacco on the mind are the results of suggestion. As an illustration: The man who takes a pipe composes himself and thinks calmly; does it, not by reason of any medicine, but because of autosuggestion. He has trained himself to the routine pipe—calm thinking. If, when he stops smoking, he retrains himself to the same degree of efficiency by using some other method of suggestion, his brain will work satisfactorily. Quitting and getting on a new basis are both up to the man.

Woman and Tobacco.—*M. L. writes: "Is cigarette smoking harmful to a woman's health? If so, how? Do you consider smoking among women a sign of degeneracy? Could one or two cigarettes a week bring injurious consequences in the future, either for oneself or one's children?"*

Reply.—1 and 2. The degree depends on the woman's age and the number smoked. If she is mature and the number smoked is not excessive, the

habit will decrease her capacity for extreme sustained exertion, but as the smoking woman is usually a loafer, she will not be troubled. If she is immature it will harm her more. If she is a fiend it may give her tobacco heart or tobacco blindness.

3. No.

4. The only injurious consequence in the future will be an increase of the habit, almost to a certainty. It will have no effect on the progeny.

Should Stop Smoking.—*W. J. writes: "I am a boy 17 years old. I weigh 145 pounds and my height is 5 feet 10 inches. I had acute inflammatory rheumatism last winter, and I was unable to use my right arm for eight weeks. I find when the weather is damp it troubles me now. I smoke cigarettes, sometimes two packages a day. I also smoke cigars. I am inclined to be round-shouldered. I do office work. Will smoking weaken my lungs and heart, or what effect does it have on rheumatism, if any? I am also troubled with nose bleed. What exercise would increase my chest measurement?"*

REPLY.—There is not much use in talking about exercises to increase the chest measure to a boy of 17 who smokes two packages of cigarettes and some cigars a day. The do-as-I-please-regardless frame of mind is pretty well established. But here goes.

Your rheumatism comes from your tonsils, teeth, gums, or nose in all probability. Go to your physician and have that attended to. It is certain that he will tell you to stop smoking. Then go to a gymnasium and have them put you to work at climbing, chinning, and bar exercises to develop your back muscles. They will also tell you to stop smoking.

Quit Smoking.—*Reader writes: "A friend who has neurasthenia has quit smoking, but, of course, still has the desire to smoke again. He has tried several times, but it seems to make him nervous; he can smoke outside with apparently no ill effects, but when he smokes in the house or office it makes him nervous, although he believes that he brings it upon himself more than the cigar does.*

"The trouble seems to be all in his throat, chest, and back of his neck; he feels O. K. but for the occasional worries and moods that make one who has neurasthenia so miserable.

"Do you think that three cigars a day would harm him and do you think they would tend to make him worry more?"

REPLY.—As I understand your description, your friend is a neurasthenic who is nervous over trying to make a decision whether to smoke or not, and he is nervous whether he smokes or does not. It seems to me that he is suffering from the typical indecision of the neurasthenic. When he definitely decides and quits thinking about it his nervousness will end and that without much regard to whether he decides to smoke or not to smoke.

The wise policy for your friend is to decide not to smoke—to decide it once for all and quit thinking about it, whereupon his worries will end.

Neurasthenics have no business tampering with drugs. Tobacco is a drug.

Tobacco Stunts Growth.—*Mrs. H. M. C. writes: "Please inform me whether smoking a pipe or cigar, when about 16 years old, will stunt one's growth. What other effect is possible?"*

REPLY.—1. Yes.

2. May cause nervousness, nervous heart, cough, indigestion, and tobacco habit.

Cigarettes of No Benefit.—*B. C. writes: "Please advise a cigarette smoker of years the reason and remedy for quitting it. Can it be done without much physical discomfort?*

REPLY.—Cigarette smoking does nobody any good. Many who smoke cigarettes never feel the harm done; others do. To quit requires grit.

Inhaling Smoke.—*R. W. H. writes: "1. Kindly explain the harmful effect on the lungs of inhaling tobacco smoke. 2. Also please state the amount of nourishment in bananas."*

REPLY.—1. The harmful effect is not exerted on the lungs. The warm smoke unduly dries the upper breathing apparatus, but not the lungs proper. The harmful effects of tobacco are exerted especially on the nerves. The nerves most frequently affected are those of the heart.

2. We eat about two-thirds of the banana. About one-quarter of what we eat is sugar and starch. As a food it compares fairly well with potatoes.

Smoking Harms Sight.—*T. L. J. smokes pipes and cigars and inhales the smoke. He wishes to know if it harms the sight.*

REPLY.—Excessive smoking may harm the sight. It is an occasional cause of blindness. Careful eye specialists can detect the effects on the eyes of tobacco excess. Generally cases of partial tobacco blindness begin to improve within two weeks after the drug is stopped.

Will Alone Suffices.—*J. W. J. writes: "When about 12 years of age I began smoking cigarettes and continued to do so until I was 22 or 23, at which time I substituted a pipe and strong tobacco. Since then, ten years ago, I have begun chewing also. I now chew and smoke strong tobacco. I have both the will power and inclination to quit the use of tobacco, but fear to do so without first taking something to rid my system of nicotin. Would it be harmful to quit abruptly without taking anything to rid my system of nicotin?"*

REPLY.—If you have the will power to quit, quit. Your system will take up the job of ridding you of nicotin. It has been doing it, and it is well trained by now. It will not be harmful to quit abruptly. The will power's the thing. If you have that, you need use nobody's remedy.

Chewing Tobacco.—*J. H. K. writes: "I know a man who chews tobacco without spitting. He has poor eyesight. Otherwise he appears to be in normal condition. Is it likely that there is any connection between his habit and the condition of his eyes? If so, in what way does the effect reach the eyes; and what is likely to be the effect on the general health?"*

REPLY.—The man probably chews slowly, and some of the juice is swallowed and some absorbed. I do not know whether or not his poor eyesight is due to his habit, but the use of tobacco frequently impairs the sight, and sometimes causes blindness. The tobacco solution gets into the blood and is carried to the different tissues in the body. The tissues are able to stand a pretty good dose of it. It acts especially on the nerves. The

optic nerve carries sight impulses from the eye to the brain. Sometimes tobacco causes this nerve to degenerate, and, rarely, it causes blindness through atrophy of this nerve.

Tobacco and Weak Heart.—*E. W. S. writes: "1. Would 5 cents' worth of chewing tobacco a week be injurious to a person with heart leakage? 2. Is a person with a weak heart liable to be troubled with insomnia? 3. Is a person with a weak heart apt to be troubled with nervousness? 4. Should a person with heart leakage take much exercise, and what kind is best? 5. Which is more injurious, smoking or chewing tobacco? 6. Would one or two glasses of beer daily be injurious to a person with a weak or 'leaking' heart?"*

REPLY.—1. No.

2. No; not until heart asthma comes on.

3. No; not particularly.

4. A person with a leaking heart valve must take enough exercise to keep his muscles strong. He needs individual medical counsel.

5. Generally smoking, though it depends on the quantities consumed and the habit as to inhaling.

6. No.

Tobacco Heart.—*A. M. S. writes: "I am 32 years old and have the appearance of being in the best of health. I have a good appetite but have suffered with rheumatism nearly fifteen years. During the day my heart beats at least 100 times a minute. I smoke a lot, but when I was not smoking I was in the same condition. I also have pains at my heart. I drink a lot of water and this seems to make me feel better. I seldom use strong drink."*

REPLY.—Any man whose heart beats 100 should have an examination by a physician capable of discovering the reason why. My guess is tobacco heart, but this is only a guess. If you will quit smoking, quit drinking strong drink, and eat less, you should lose some flesh. Slow up your pulse and have less of what you call rheumatism.

Tobacco and Hearing.—*D. S. H. writes: "As a specialist on the ear, nose, and throat, I am thoroughly convinced that an enormous amount of damage is done by constant irritation to the pharynx, and therefore to the eustachian tube. In fact, I am convinced that if the irritation from tonsillar inflammation, bad teeth, and the irritating effects of tobacco were eliminated, men and women would retain their hearing much longer and have a better quality of sound perception. I helped to examine 7,000 trainmen on the Sante Fé railway two years ago for sight, color sense, and hearing. I was told beforehand that trainmen, from the noises they were subjected to, had bad hearing, but after this examination I was compelled to think that the aforementioned causes had more to do with the loss of hearing in these men than had ever been thought of. Illustrating: Nearly every man whom I examined, no matter how long in the service, if he had good, clean teeth and was a non-user of tobacco, had good hearing, while the reverse was true of the chronic conditions from either bad teeth, bad tonsils, or tobacco irritation. It is not an infrequent occurrence to have patients in the specialist's office with sore throat that can immediately be attributed to excessive tobacco irritation."*

Craving That Persists.—*J. W. R. writes: "Will you please tell me about how long one must abstain from the use of tobacco in order to cease*

craving for it? I began smoking at 17. At 27 I left off entirely for four years. At 31, still craving the drug, I resumed smoking and have smoked ever since. I am now 51."

REPLY.—The kind of craving you had would not stop in 100 years, assuming that you kept going that long. When one stops the use of a drug the cells affected by that drug cry out. It is a species of hunger. In a few days, say two weeks at most, that craving has passed.

The craving that persists is a form of mental unrest. It is not a craving for tobacco especially. It is a form of mental perversion which calls for something, some drug maybe, and, if so, any other drug will answer, or any habit. You are 51. Be a man.

Danger from Cigars.—*W. T. N. writes: "Will you kindly state whether there is much, if any, danger of disease being transmitted through the putting of cigars in one's mouth?"*

REPLY.—Some cigarmakers still practice the nasty habit of shaping the cigar end by moistening and rolling it between their lips. Again some smokers put their cigars in their mouths and then clip the end with the cutting machine. The next man does the same thing. In this way the cigar cutter may become a source for the spread of disease.

Cigarette Habit Cure.—*R. T. B. writes: "Will you kindly advise where Dr. Kress's cigarette cure can be purchased? If it is not on the market, please publish the prescription. I am sure it would do much more good in this manner than that in which it is being tried out now in the anti-cigarette crusade."*

REPLY.—The treatment is as follows:

"The mouth wash calls for six ounces of silver nitrate solution, one-eighth to one-fourth of 1 per cent. Use as a mouth wash after each meal, not to exceed three days; then after breakfast only for not more than four days. Do not swallow any of the solution.

"Chew gentian root (not the powder) whenever the desire for smoking appears. Gentian root is slightly tonic and an aid to the digestion. It may be used for several weeks without injury.

"The diet for the first two weeks consists exclusively of fruits, well-baked cereal foods, and milk. The moderate use of nuts, well masticated, is of value. At the close of each meal use fresh, slightly acid fruits, such as peaches, pears, apples, pineapples, etc. Drink sweet milk, buttermilk, malted milk in place of coffee, tea, or cocoa.

"In some special cases an entire milk diet for a few days may be beneficial, especially if there exists an irritable stomach, bordering on ulceration, with excess of hydrochloric acid. Where the digestion is slow and there is a deficiency or absence of free hydrochloric acid, a diet composed entirely of fresh fruits for a day or two preceding the grain, fruit, and milk diet, may be of benefit.

"Baths, preferably the Turkish bath, will assist in rapidly getting rid of stored-up nicotin. As a rule, it takes from three to six weeks to eliminate entirely the desire for tobacco. The time depends upon how closely the directions are followed."

Use of Snuff.—*M. B. writes: "Has the use of snuff any effect on one's health or nervous system?"*

REPLY.—The use of snuff is one of the mild vices of mankind. The habit is not a commendable one. Moderately used, it is not positively injurious. The catarrh snuffs frequently contain cocain and are therefore highly injurious.

COFFEE

Coffee is a drug. Those who are addicted to its use are drug addicts. The people of the United States are among the largest users of coffee of all the people of the world. Its use is on the increase.

From the standpoint of public hygiene the coffee question is worth while. It is much the most widespread form of drug addiction. Some people are certain that coffee is of service to them. Some are equally certain that it harms them. Many are much interested, though they are in doubt as to whether it benefits or harms them. The largest number enjoy their cup of coffee, and they care not at all whether it harms them. From the standpoint of individual hygiene the coffee question is worth while going into very carefully.

Two-thirds of the coffee entering the markets of the world comes from Brazil. That country exports twenty times as much coffee as the Dutch East Indies, the coffee from which is commonly called Java. Little coffee is exported from Arabia, and practically none from the small Mocha district. Of the small amount of Arabian coffee exported the best goes to Turkey and Egypt, near-by markets.

The world's use of coffee per year amounts to about 16,000,000 bags. In fact, the disposition to overproduce in Brazil is so strong that the governmen exerts itself to maintain the price of the berry.

The only approximately accurate figures on the use of coffee we have are those for the United States, the countries of western Europe, and Australia. The people of Holland in normal times use about fifteen pounds of coffee per capita a year. Norway and Sweden follow, each using about fourteen pounds. The per capita use by the people of the United States is twelve pounds. The German people use about seven pounds, and the British, Canadians, and Australians about one pound.

Some of the peoples use tea instead of coffee. Probably the Chinese and Indians are the most inveterate tea drinkers, but there is no way of knowing the per capita use of the drink by these peoples. The New Zealanders, Australians, and nations composing the United Kingdom are the heaviest users of tea. They consume more than 6.5 pounds per person. The Canadians use 4.3 pounds; Hollanders, 1.45 pounds; Russians, .94 pound; Americans, .89; Germans, .11; and French, .06.

Tea contains about twice as much caffein as does coffee. By multiplying the per capita amount of tea by two and adding it to the pounds of coffee, we get a fair idea of the relative use of caffein-containing beverages by the races for whom we have statistics.

We find that the Hollanders lead with seventeen pounds. They are followed by the Swedes and Norwegians. Next comes a group composed of the people of the United States, the British, including English, Scotch, and Irish, and the Australians. Their rate of consumption is around fourteen

pounds. The Canadians use nine and six-tenths pounds. The Germans use about seven, and the Russians about four.

Legends tell us that the Chinese used tea 3,000 years before the birth of Christ. Europeans began to use it in the sixteenth century. In the seventeenth century its use in England was fairly well established. By the eighteenth century the English people were using it at one-third the per capita rate now prevailing.

For centuries governments have always exerted themselves to promote the traffic in tea. During the 5,000 years prior to the time when trading and plantation companies, backed by government grants, strove to develop the planting and merchandising of tea, its use as a beverage seems to have been limited to rather a small part of the Chinese people.

On the other hand, coffee has had its troubles. The legend is that the use of coffee was discovered in Abyssinia. A flock of sheep which fed on coffee berries was wakeful and restless at night. After a while these coffee jags attracted the attention of one shepherd after another, and presently some of them investigated the cause and tried the berry.

The Arabians began the use of coffee before the fifth century. Its use was becoming so general in the time of Mahomet that the Koran prohibited its use.

Hollingworth, who in 1912 published the best study of the effects of caffein which has come to my attention, says that the average cupful of hot tea (five fluid ounces) contains one and five-tenths grains of caffein. An after-dinner cup of black coffee (two fluid ounces) contains one and five-tenths grains of caffein. An average glass of iced tea contains two grains of caffein. An average cup of good coffee and milk (three ounces of coffee and two ounces of milk) contains two and five-tenths grains of caffein.

Professor Hollingworth's study was made on a "poison" squad of sixteen people. The test lasted forty days. Its purpose was to find whether moderate doses of caffein had a good or bad effect on persons who took it.

Generally speaking, he gave doses of less than six grains a day. Let us say that most of his subjects took less than three cups of coffee a day. His conclusions, therefore, apply to people who take two cups of coffee a day.

When more than six grains a day was the dose the subjects were harmed. He did not study the subject of the prolonged use of coffee nor its effects on digestion.

It has been well established that coffee is a good muscle and nerve stimulant; "that it lightens the sensation of fatigue and sustains the strength under prolonged and severe muscular exertion;" "that coffee squads come in first in endurance tests, water squads second, and alcohol squads last;" that coffee produces "a feeling of buoyancy and exhilaration comparable to a certain stage of alcoholic intoxication, but which does not end in depression or collapse."

Rivers' study establishes the point that the stimulation from caffein is not followed by the letting down which follows the use of alcohol and other stimulants.

Hollingworth found that there was no secondary reaction following the use of caffein in the tests made by him. Even when the dose given was large enough to produce bad direct effects, there was no "katzenjammer."

The Hollingworth tests were to determine the effect of caffein on the control of the muscles, the motor nerves, the nerves of coördination, and on certain kinds of mental activity.

A type of result was that shown by a test known as the tapping tests. The effect began ninety minutes after taking a small dose and forty-five minutes after a large one. It lasted for one to two hours for a three-grain dose (a large cup of coffee) and for four hours and a half after six grains (two very large cups). No secondary effects followed within seventy-two hours.

Another test was to determine whether coffee made the hands tremble. One to four grains of caffein caused a slight tremor. Six grains (two very large cups) caused an appreciable unsteadiness of the hands, coming on about an hour after taking and increasing for three hours.

Muscle movements requiring several muscles to work together with proper relation to one another were better and more thoroughly carried out when a small dose of caffein was given than without it. On the other hand, a larger dose, six grains of the drug, produced a retarding effect.

It was found that typewriting was speedier after one- to three-grain doses of caffein (half a cup to a full cup of coffee), but that it was slowed up by two full cups. Typewriting was freer from errors when the operators took coffee. This was true even after two large cups.

A series of tests to determine whether the mind worked better with or without coffee showed in a general way that mental processes were improved by coffee. The effect came on from two to four hours after the drug was taken, and it lasted into the next day. The stimulation was not followed by mental depression.

These studies prove that a man can increase the volume and the quality of the work, both mental and physical, by taking one-half to one cup of coffee a day. When he takes two large or three ordinary size cups of it, he improves some of his capacities but lessens others.

The groups of people experimented on were not specially fatigued or tired. In this connection it is well to recall the experiments by Rivers, which prove that, when a man is fatigued, coffee will increase his capacity for work either mental or physical.

However, this is only one side of the question. Various other phases are of some importance. A great many people are interested in knowing the effect of coffee on sleep. Hollingworth came to the conclusion that the sleep of the average person was not disturbed by taking one to four grains of caffein (one-half to one large cup and one-half of coffee) a day. Some of the people experimented on slept poorly from even that quantity. When one cup of coffee a day was taken for several days sleep was disturbed on the second or third day in certain instances in which there had been no disturbance on the first day.

Most of the people who took six grains a day (a little more than two large cups) slept poorly; in consequence, when the coffee was taken with the food, the harmful effect was much less than when it was taken alone. Fat people stood coffee better than thin ones. The morning cup of coffee did not disturb sleep so much as coffee taken later in the day.

The age of the individual did not affect the effects of caffein on the people experimented on; nor did previous coffee habits.

One subject investigated by Hollingworth was the influence of caffein on the general health. At the end of forty days of this test "the subjects quite uniformly report improvement in health, spirits, and general efficiency. This is, perhaps, due to the regular *régime* of life followed during the forty days."

When we examine the reports of the individuals we find that some of them were definitely nervous at times, had headaches, palpitation, and indigestion. This rarely happened with a small daily dose. Some form of disturbance was frequently noticed when the dose equaled six grains a day.

When we apply these results to the habitual use of coffee, we must bear several facts in mind:

First, the work was done with pure caffein. A cup of coffee contains several other ingredients, some of which have physiological effects.

Second, when the caffein is translated into terms of cups of coffee the dosage used is not large.

Third, the tests extended over forty days. Most of the people who want to know about coffee have in mind the use of coffee for forty months or forty years.

Fourth, the tests were, in the main, to determine whether coffee immediately increased mental and physical power and whether there was sag within a few days.

A little information was gained as to cumulative effects, headache, sleeplessness, and one or two other incidental questions of prolonged effects. The broad question of ultimate effects of prolonged use was not inquired into.

Bearing these limitations in mind, the following conclusions seem justified by the work of Hollingworth and that of Rivers so frequently quoted:

1. Caffein in small doses (one to four grains) increases the quantity and quality of mental and physical work.

2. Caffein in larger doses (six grains and over) decreases the above capacities as often as it increases them.

3. Caffein increases the capacity for work of a tired brain or tired muscles.

4. Caffein produces a sense of buoyancy and well-being.

5. The stimulating effects of caffein are not followed by the depression which follows the use of other drugs.

6. The amount of caffein in one full cup of coffee does not produce sleeplessness or nervousness. Many took the amount in two cups without discomfort. Many were disturbed by two cups. When the amount taken went beyond the amount of caffein in two full cups the majority were harmed by it.

7. The effects of caffein are less in fat people than in thin ones.

8. The effects are much less when the drug is taken with food.

9. The drug is somewhat slow in exerting its effect. Generally more than an hour was required. Often two or three hours passed before the effect was felt, and some of the effect commonly held over until the next day.

INGREDIENTS OF COFFEE

The *London Lancet* in 1913 published the report of a commission that had investigated the effects of coffee. For their chemical analyses the members made use of the brew in the cup rather than the berry. To their minds it mattered little what the berry contained, as long as some of the ingredients remained in the grounds. For instance, coffee berries contain 12 per cent oil, but there is only a very small percentage of oil in a cup of coffee.

The analysis of coffee made from a high roasted average grade Costa Rica coffee showed:

Total extract	24.30	Caffetannic acid	3.9
Ash of extract	4.66	Caffein	1.23

A cup of coffee is practically without food value. Analyses show a trifling quantity of dextrin, sugar, and traces of alcohol. There is no starch. It contains 1.25 *per cent of protein. There is* .6 *per cent* [*six parts in* 10,000] *of a nitrogen-containing oil—caffeol.*

However, if coffee without sugar and cream is without nourishing qualities, it does not follow that it is without effect on the system. In the first place there is a considerable percentage of caffein, 1.23 per cent, a powerful medicine, the effects of which have been described already. Caffein is closely akin to xanthin, and xanthin is a chemical substance produced in the human body supposed to be related in some way to the cause of gout.

Most analysts are of the opinion that coffee contains a small amount of pyridin. Pyridin is formed when paper is burned. It is held to be the substance responsible for the benefit which asthmatics get from smoking asthma cigarettes. When roasted coffee is treated with chloroform a chemical, noncrystalline and nonsoluble in ether, is extracted. It has the strong but pleasant aroma and bitter taste of coffee.

Caffein, pyridin, caffeol, and this flavoring substance are responsible for the effects of a cup of coffee.

Coffee taken into the stomach is rather quickly absorbed therefrom. It differs in this particular from tea, since tea is not absorbed until it gets into the small intestines. Therefore, the effects of coffee begin to show themselves after a brief period. The person who has partaken feels the influence within a half hour. Hollingsworth's tests showed effects plain enough to register his subjects in an hour, sometimes less, sometimes more.

On the mind the first effect is drowsiness, quickly followed by wakefulness. The wheels of the mind work easily and truly.

In so far as there is any effect on digestion, coffee is of some slight aid. Especially is this true of the after-dinner cup of coffee, taken at the end of a full meal. The stimulating effect of some of the ingredients is somewhat more than an offset to the restraining effect of the caffetannic acid. The great outstanding effect of a cup of coffee, though, is the stimulation to brain, nerves, and muscles—a stimulation without a closely following sagging.

COFFEE EFFECTS

Coffee has been accused of harming the digestion. Is it guilty of the charge? I do not think so. The charge rests upon the fact that people with indigestion are able to taste the coffee taken at the previous meal. This merely means that coffee has an aroma and a taste, which facts needed no proof. For the same reason every aromatic and every positively tasting food in the list of foods has been accused of causing indigestion.

The blame has been laid on the oil. The amount of oil in a cup of coffee is small. It is not to be compared with the amount of grease in a piece of meat or a piece of buttered bread.

The blame has been laid to the caffetannic acid, but coffee is not an astringent. It does not pucker the mouth. The small astringent effect of the tannic acid present is more than offset by the dilating effect on the blood vessels of the heart.

Is the use of coffee of service? Yes. When? When one is tired, fatigued, unable to concentrate, and yet must keep going or must keep up for some supreme effort.

Does the daily use of coffee as a beverage, continued for a series of years, do harm? Yes. A horse cannot be whipped daily for years without being harmed. A man cannot be nagged continuously for years without being harmed. The very fact that, when fatigue is slowing muscles and brain cells down, coffee will whip them on, the very fact that under the stimulus of coffee capacity is unduly excited, is proof that harm will come if the process is kept up for a series of years.

That no immediate secondary sagging is noted proves nothing. It is the old question of the cost of something for nothing.

When, through the influence of coffee, you become able to do and do more than you would otherwise, you must settle some time or other. That is just ordinary sense.

Can the scientist tell you how you are to settle? I think not. The statement that you settle in terms of high blood pressure may be true, but proof is lacking. The same can be said of kidney disease, caused by coffee. But then, there's mighty little we know of the cause of high blood pressure, worn out arteries, frazzled kidneys, or frayed hearts.

Health departments are just beginning to study the wear diseases. A hundred years after the writing of the "One Hoss Shay" we shall begin to know what it was all about.

Shall one take his morning cup of coffee? Perhaps. To sleep in a well ventilated room were better. To take a cold plunge, or a shower, or a ride, or a walk were better; but, failing these, a man may use coffee to get himself together for the day.

Should a man take coffee at other hours? Yes, when he needs a bracer in order to meet a need; then not regularly, or by the clock.

Should he take an after-dinner cup? Yes, if he has eaten like a glutton and needs help.

COFFEE MAKING

The National Coffee Roasters' Association a year or so ago appointed a committee on better coffee making. This committee has issued its report, from which the following is taken:

First of all, the ease of extraction of the virtues of the coffee bean is directly proportioned to the fineness of the grinding. The first essential, and the most important, is that the coffee should be finely ground. To grind finely is also economy, as less coffee is needed. Finely ground coffee does not keep its strength. Therefore grind your own coffee, but in a high grade mill.

Water at 212° (boiling) is twice as efficient in extracting color and more than twice as efficient in extracting aroma as water at 150°. Cold water is very efficient in extracting the caffein and the tannic acid.

The committee tried seven methods of preparing coffee:

1. Coffee placed in cold water, brought to a boil, boiled five minutes, coffee ground medium.
2. Same method, but coffee used was ground fine.
3. Coffee placed in cold water, brought to a boil, taken off the fire and allowed to steep. Medium ground coffee used.
4. Same method, but finely ground coffee used.
5. Percolation three minutes.
6. Percolation five minutes.
7. Filtration; pulverized coffee used.

To get the flavor and only a moderate amount of caffein, use method No. 7. Method No. 6 yields ten times as much tannin as No. 7.

If one wants some flavor, but must avoid the stimulating effects of caffein, method No. 3 is best. It gives less than one-sixth the caffein given by No. 2, and a little more than a fourth as much as method No. 7.

Boiled coffee has the least to commend it. It is high in caffein, tannic acid, and bitter matter. Long continued boiling makes the coffee weaker, not stronger. After about five minutes of boiling the aroma is driven off, without extracting from the coffee any desirable matter.

The report says that most of the deleterious effects of coffee are due to excessive boiling, or to the use of grounds a second time mixed with some fresh coffee.

In the steeping method the extraction comes mainly just as the water boils. In using a percolator the water does not heat above 150°. The apparent boiling is not really boiling. The condensed vapors percolating through the coffee are not hot enough to extract the best of the flavor of the coffee. It does extract the tannin. Percolated coffee is about 25 per cent higher in caffein than filtration coffee. It requires more coffee than does the filtration method.

In the filtration method the finely pulverized coffee is placed in a close mesh muslin bag. Boiling water is poured through it slowly. Nothing is gained and something is lost by pouring the water a second time. This method uses least coffee.

In the comparative tests the experimenters used 1,200 grains of coffee in a pint and a half of water.

The experimenters favor the filtration method, except for those overstimulated by coffee. They should used the steeping method.

THE COFFEE OR TEA HABIT

A victim of habit is willing enough to admit that there are habit victims, but unwilling to admit that he is one of them. This is fortunate. Just this mental attitude saves many. It is like trying to stay in bed with a cocklebur. This constant self-asking, Is mine a drug habit?—this constant assertion, I can quit—made to convince oneself and not others—this mental unrest sometimes makes a man grit his teeth and pull out of the mire. All in all, it does no harm for the woman who always carries a headache tablet in her pocketbook or for the man who takes his morning brandy to say that she or he has no habit.

The most difficult of all places to draw the habit line is among tea and coffee drinkers. The use of these drugs has much to commend it. When a man's mental energies are at "sixes and sevens," when the different faculties of his brain are not doing good teamwork, a cup of coffee or tea may harmonize things.

Or, better yet, let us say that the little harm it does is more than compensated for by good in other directions. It indicates that he or she still has pride. The denial of a habit by the addict indicates that he still has pride. For a man to pull out of the mire of opium requires teamwork by his mental impulses. Unless he has pride as one of the wheel team he will not get out.

Recently there has been some research work decidedly favorable to tea. The writer says a man does better work with it than without. Such benefit is not because of any food value, because neither tea nor coffee has enough food or fuel value to take into account. It is because of better teamwork.

Another advantage of tea is that it is a pleasant way to drink sterile water. No wise man drinks water from unknown sources. Our country is getting too thickly populated for that. *Boiled water, unflavored, is not generally liked. Boiled water, slightly flavored with tea, is the one drink that tastes well, hot, cold, or in between.* The test is the in between.

Tea and coffee may serve a purpose, and I think right there is the place to draw the line.

For what purpose do you drink it? Do you drink it to make you feel warm? The hot drink throws the blood to the surface and warms the skin, but a warm skin loses heat rapidly and presently the loss more than offsets the gain. If you are of this group—quit it.

Do you drink it at supper to hold you together for work after supper?

If a habit, it does harm and not good. The wise course is to train oneself to brain teamwork and to leave enough in one's energy bank to draw on for the evening's work. Do not drink it at night.

There is no excuse for the noon or mid-afternoon cup except it be as an excuse for a break in the day's concentration. On that basis, it is the height of wisdom from the efficiency standpoint, but let the draft be very weak—scarcely more than flavored water.

For the morning cup there is much excuse. The body has been storing up energy all night. In the morning it has some tendency to leak—to waste.

The first work of the morning is to hitch up the team. A cold bath, water or air, can do it. Some open-air work can do it. A cup of coffee or tea can do it. A well-trained man can do it without any help.

But there are people who have headaches or "grumps" or are generally no account if they do not get their coffee. For them it must be strong. They are fiends. They are in the same boat as opium, cocain, or whisky fiends.

A good rule is to quit anything that has become to you a crutch or that, you can figure out, usually becomes a crutch.

To summarize:

Morning cup. A cold bath or a round of exercise is better, but for most adults it is permissible—or even more.

An afternoon cup—Yes, if you will make it very weak.

The night cup—No.

The noon cup—No.

When traveling or camping, yes—if taken weak as a cup of sterilized water.

To brace for a supreme effort, yes; as a habit, no.

TEA AND WAR

In the Russo-Japanese War, some part of the great result in preventing typhoid fever in both armies was due to the habit of drinking tea instead of water. The soldier, starting out on a day's march, would fill his canteen with weak tea. Tea is boiled, flavored water. From the sanitary standpoint it came back to this: the soldiers were drinking sterilized water.

FIG. 146.—TROPICAL AMEBAE CAUSE ABSCESS OF THE LIVER, DYSENTERY AND POSSIBLY DIARRHEA.

In the next war, however, the typhoid problem will not exist. The troops will be vaccinated against typhoid, and the experiences of the last three summers along the Rio Grande teach us that typhoid as an army menace is among the disappearing diseases.

However, the soldiers of 1861 remember the dysenteries with dread. Some of these ran an acute course and got well in a few weeks. Dr. Vaughan of the University of Michigan proved that most of these diarrheas at Chickamauga were atypical forms of typhoid and probably the same is true of those of the Chickahominy.

Major Whitmore of the United States army has been studying the dysenteries with a view of finding a way to protect the army against them. Incidentally, whatever is discovered is available for the people at large.

The chronic dysenteries of which the soldiers complained so much after 1865, Major Whitmore says, were due to amebae. An ameba is a small animal

belonging in the same class as the malaria parasite, but larger and different in many other ways.

This form of dysentery sometimes kills by reason of the ameba getting in the liver and causing liver abscess. But, in the main, the harm it does is by producing a chronic disabling disorder—a producer of inefficiency.

Many thousand people in civil life suffer from chronic amebic dysentery. The acute dysenteries or fluxes are due to infection with bacteria.

Shiga, a Japanese bacteriologist, studied the bacteria of dysentery a number of years ago. He found the group of germs responsible and then developed a serum for the condition. The serum has not proved satisfactory for summer complaint in babies, but Major Whitmore says it is more serviceable in dysentery of grown people.

This form of complaint was not highly prevalent in the Japanese army because the soldiers cooked all their food, and boiled their water to make tea. But our people have never had the habit of drinking weak tea instead of water.

So long as they are at home drinking water known to be good they should not drink tea, but they should not drink tea when hunting, camping, or going to war. They get dysentery from spring water, creek water, lake water, or from eating raw foods. The Japanese serum may prove of service to our people.

Coffee and Sleep.—*A. B. writes: "I teach, and the strain invariably tells on me. I find myself quite frequently in a state of nervous exhaustion. I use tea and coffee, drinking usually two cups of each a day. My friend, who also teaches, uses neither and does not suffer fatigue as I do. 1. Do you think one less likely to suffer thus if tea and coffee are abandoned? 2. If one is tired and therefore sleepless, would a little strong coffee be conducive to sleep? On the whole, is it advantageous or disadvantageous to use tea or coffee?"*

Reply.—1 and 2. Yes.

The above answers are apparently contradictory and explanation is needed. Tea and coffee are general stimulants. They are drugs. They stimulate judgment and control, among other effects.

People differ radically in their susceptibility to fatigue. That your friend is less fatigued at the end of the day may be due to her better mental habits and therefore lessened susceptibility to fatigue. However, one who whips himself through the day by using four cups of a drug can blame some part of his fatigue on the drug taken.

Sometimes insomnia is due to a racing mind, a mind that jumps around, here, there, and everywhere. A small dose of coffee for some persons will steady the mind and bring about sleep. A full dose of coffee will prevent sleep.

Avoid Tea and Coffee.—*K. L. D. writes: "What foods act as stimulants without being injurious? For years I have been a coffee drinker and feel the need of such a stimulant, but wish to discontinue tea and coffee and want something else to take their place. I am intensely nervous. I have been engaged in office work for a number of years. I do not seem to have the strength or vitality that I used to have and would be glad to know how to build up through proper eating and a light exercise. Long walks do not agree with me—that is, over six miles at a time. I think I recently*

overdid myself by walking more than this each day. I am a woman over 28 years of age."

REPLY.—None of the foods except tea and coffee is stimulating. If you are being harmed by the stimulation of coffee, stop it. Substitute any warm drink which suits your palate. One is as good as another. If you are not in good condition, a six-mile walk certainly is too much for you. Get Galbraith's "Personal Hygiene and Physical Training for Women," read it, and follow it.

Harm from Coffee.—*C. T. E. writes: "1. Can coffee be made harmless except by the removal of caffein? 2. Should a person who has had an operation for gall-bladder infection, has neuritis and slight rheumatism, abstain from coffee?"*

REPLY.—1. In addition to the harm from the excessive dosage of caffein, the oils of coffee sometimes impair the digestion. However, the statement that to remove the caffein is the only way to make coffee harmless is reasonably accurate. Overcoming the effect of drug habits by the use of other drugs does not help.

2. No more and no less than any other person.

Coffee and Tobacco.—*N. H. C. writes: "This statement is made: 'It is every bit as bad for one to drink a cup of coffee every morning for breakfast as it is for one to take a glass of wine every day for dinner—as a habit.' Also: 'The coffee habit is as bad as the tobacco habit.' Are these statements true? My son says he will quit using tobacco if I will stop drinking coffee."*

REPLY.—No one of the habits is a good one. I think I should rank them in the order of their badness—wine, tobacco, coffee. Moderately indulged in, none of them is a very bad habit. I think you had better agree with your son that they are almost on a par, concede him a little more than you ought to, and then contract with him to stop coffee if he will stop tobacco.

Coffee and Caffein.—*Mrs. A. C. H. writes: "I was very much interested in your recent article on 'Coffee Making,' but there is one point I do not understand. Will you kindly explain? You say: 'Cold water is very efficient in extracting the caffein and tannic acid. . . . If one wants some flavor, but must avoid the stimulating effects of caffein, No. 3 is best. . . . Coffee placed in cold water, brought to a boil, taken from the fire, and allowed to steep. Medium ground coffee used.' It would seem to me that the cold water used in No. 3 ought, according to the first statement, to result in more caffein. How can I get the complete report referred to in your article?"*

REPLY.—The condensed account affords more ground for your conclusion than did the fuller account. Our article was based on a report in the *American Food Journal,* published at 15 South Market Street, Chicago. The *Food Journal* editor can tell you where to get a copy of the original report.

Coffee Story False.—*W. J. N. writes: "I have heard from many different sources that by putting cream and sugar into tea and coffee the beverage is rendered more harmful than if it was drunk plain. Is this a*

fact? Some say that they bring out the tannic acid in tea and the caffein in coffee."

REPLY.—It is not a fact.

No Food Value in Coffee.—*C. H. C. writes: "Is it harmful to drink much coffee, either strong or weak? What is your medical opinion regarding substitutes for coffee?"*

REPLY.—Yes. Coffee is a "habit-forming drug" with practically no food value. Coffee substitutes are hot flavored "waters." For those accustomed to drinking something warm with their meals they are all right.

No "Weed"; No Tea; No Coffee.—*A. B. C. writes: "Do you think a person of nervous temperament who is making an effort to overcome nervousness by exercise of the will should smoke cigars, cigarettes, or a pipe, and drink tea and coffee?"*

REPLY.—No.

To Make Tea.—*J. writes: "A friend and I had an argument as to the hot water supplied in flats. I contend that the boiler and pipes cannot be cleaned, and hence corrode. Therefore, that tea and coffee, for instance, should be made with cold water brought to the boiling point in a teakettle which can be cleaned out. She says that the hot water supplied in the pipes is all right for drinking purposes. Who is right?"*

REPLY.—I think you are both right. Hot water from hot water pipes is good for drinking purposes. However, making tea is an art. To make tea properly, heat water in a vessel until there is a vigorous boiling; then pour water on the tea, and permit the mixture to stand.

Too Much Tea.—*R. H. writes: "I am a woman, aged 35. I have headaches at times, am troubled with insomnia, and am not physically strong. I drink three cups of tea at each meal, using plenty of cream and sugar. Do you think my tea drinking excessive and likely to do me harm?"*

REPLY.—I do; very much so.

The Coca Cola Habit.—*Young Man writes: "Please explain fully the injurious effects of the coca cola habit."*

REPLY.—Coca cola contains no alkaloid except caffein. Its effects are the same as those of coffee. People get the coca cola habit just as they get the coffee habit.

A few days ago I stood at a soda fountain and heard two boys order coca cola, adding, "Make 'em strong, boy, you know. Make 'em strong." A little while ago I saw a sign, "Double strength coca cola, 10 cents."

A certain portion of the coca cola drinkers now call for ammonia in their drink. These illustrations cover your point.

The habit of taking stimulants is a bad one. A man gets up in the morning somewhat let down. Instead of cranking his machine by a cold water bath or a cold air bath or a few minutes of exercise in his bathroom, he takes a cup of coffee.

At 11 o'clock and once or twice at other hours during the day he feels as badly as he did before breakfast. He steps to the nearest stand and throws down a coca cola. Almost instantly thereafter his machine speeds up. After a little while his glass has no kick. He then wants the boy to "make 'em strong." Next he buys double strength. Next he gets the kick by adding ammonia.

CHAPTER XXI

The Mind

The family physician of half a century ago was a very poor scientist, and, from a purely medical standpoint, scarcely worthy of his hire. Yet he was "mighty good for sickness." He looked at the patient's tongue, felt his pulse, asked some questions, and fixed up some medicine.

The laboratory trained physician of the present day would say that he had done very little for his patient. Certainly he had made no chemical or bacteriological tests, no blood pressure determinations, he had not taken off his coat and worked over his patient. Yet there must have been some way in which he had done good, for certainly so great an institution as the medical profession could not have been built up on any basis other than utility.

The explanation is that he had a fair knowledge of personal hygiene and right living,—and he was a rattling good mental healer. He begot faith and courage, and radiated sympathy and cheer.

It is a far cry from the science of symptoms, which found its flower in the writings of Trousseau, to the science of causes, using symptoms but incidentally as it flowers, in the writings of Osler. As the practice of medicine has gone beyond the expressions of disease into its causes, it has left the field of symptoms poorly attended.

Let it be understood that it is the physicians who have moved. People have stayed where they were. Meanwhile symptoms, like branches, have grown up more luxuriantly in this nerve-racking, self-centering, neurasthenia-engendering age than in any other time.

In order to fill the field which was left when medical men moved out, several agencies have flourished. One of these is social service associated with or separate from medicine; another is Christian Science.

In saying that these agencies have come into an unoccupied field I do not wish to say that their motives are the same, or that there is any kinship between them. Each developed because society abhors a vacuum.

This field, vacated by medicine, has had its borders extended. There may be fewer diseases than in olden times but there are more symptoms.

It was inevitable that, when the doctors developed the plan of concentrating on disease and neglecting the patient, there should grow up a number of specialists dealing with symptoms primarily and disease secondarily or not at all.

The mind of the prospective parent cannot cause birthmarks or physical deformities.

There is a field for hypnotism, suggestion, autosuggestion, the mixed suggestion and mental training of Du Bois, the analysis and mind training of Freud, the methods of the mental healer, spiritual healer, faith healer—related methods all—as well as for the pills taken with faith.

This being so, is it not wise for those who have not given the matter thought to read what mind can and cannot do to the human body?

What are some of the errors and some of the facts?

A common error relates to heredity. The mind of the mother has no power to mark her unborn babe. The mother's cell, the breeding cell from the mother, is given its type and its power to fix the character of the offspring by the mother; the cell from the father gets its type and its power to determine type from the father. These two cells come together and start the new cell called the child.

When they come together the last entry is made in the book of inheritance, and the developing child clicks off his changes in regular routine, regardless of what is going on in the outside world, just as a piece of machinery running its routine is uninfluenced by the wind which blows outside the building. No shock, no unusual sights, no dreams, nothing which enters the mind of the pregnant mother can mark or deform the baby.

Another error, though not of much consequence, relates to the influence of mind over life and death. Is it possible for the mind to prevent death? Or, to put it differently, can any mind or body ever be developed into any state where life will be perpetual? No, Dowie, Mrs. Eddy, the story is always the same. Your theory for perpetual life did not work in your case. It never has worked. It never will work. Mind can neither cause death nor prevent it.

Human life and death are just as real as the lives and deaths of trees or cows, or as the wear on steel rails, and no philosophy will ever make it different. The human body is real, just as all matter is real, and it obeys divine law, and wordy words, whether termed human or divine, cannot change this obedience.

When it comes to diseases, the lines are not so sharply drawn. Disease is a hodge podge. In it are some elements with which the mind has nothing to do and other elements over which the mind has control. "It is the sick man who makes the disease." This, interpreted, means that, while the real difficulty is due to morbid processes, the symptoms which express the disease are in many instances the interpretation given the condition by the mind of the patient.

I have received many letters saying that when I write about disease I promote disease by engendering fear. This is true in some measure; untrue in greater measure. Sometimes the writers have made the mistake of detailing instances of diseases which were the result of fear, and at once they have gotten into water which was over their poor, foolish heads.

They have usually specified infectious diseases. Therefore, what is the truth about fear in relation to such diseases as consumption, pneumonia, diphtheria, and scarlet fever, and many others of similar kinds?

Occasionally it has been found that an animal, profoundly shocked by violent fear, has had its susceptibility to infection increased. As these infections have been more closely analyzed and studied, the importance of this factor in infection has decreased until the opinion now is that violent mental shock only has a slight influence in changing susceptibility and minor emotions, and lesser mental states have none at all.

Most cults recognize these limitations after some sort of a fashion. That

susceptible children exposed to scarlet fever contract the disease in 60 per cent of cases is capable of a demonstration too mathematical to be denied. In consequence, they usually except contagion.

Christian Scientists are told by their leaders to report contagious diseases.

Surgery is a very limited field, but, within its limitations, it is much more exact than medicine. Demonstrations in the course of surgical procedure are much more convincing than those of medicine. In consequence, many of the cults, and those the wisest, also except surgical conditions.

But there must be some basis for the growth of Christian Science and other kinds of mental healing. Among their adherents are bankers, whose minds work very accurately when it comes to business. It cannot be that, when it comes to the business of the human body, they go off mentally. Among them are judges capable of weighing evidence. If some part of these teachings cannot stand the acid, other parts must, or these judges would not go on accepting.

Where is the explanation?

The brain dominates its sister organs in the commonwealth called the human body. It can furnish symptoms where there are none. It can exaggerate existing symptoms. It can pervert and change symptoms, so that they bear slight relation to their beginnings.

It is the mind that interprets.

"It is in the mind that the poppy is red, the apple odorous, the music of the lark is felt."

The statement that it is in the mind that the poppy is red does not mean that the flower has not certain pigments. It means that two different minds, seeing the same poppy, might interpret its color in different ways.

Symptoms are conditions talking in the language they know, as the poppy speaks in mind-interpreted pigment.

Let us illustrate with the symptom pain. One mind would interpret it as something scarcely worth noticing; another would writhe and cry out under it.

The human machine cannot run without friction. With a car wheel, every turn means some heat, some noise, some wear. Every act of living means some heat, some noise, some wear.

And so on with other phenomena. A function goes wrong, and, dwelt on, grows more wrong, and still more wrong. Studying human ailments might be compared to picking a duck. One strips feathers, and still more feathers, until he begins to wonder if the duck is not all feathers. If he persists, he will finally get down to duck.

If one is stripping feathers from a man's symptoms, after a while he will get down to duck. Sometimes, when the feathers are all removed, he finds there is and has been no duck.

Such cases are easily proper for faith cure.

On the other hand, some birds have but few feathers, and in them there is but little field for faith. Between, there lies a mixed field—some part best cured by one method; other parts by the other.

After applying the law of probabilities, weighing the tendency of diseases to get well spontaneously even without care, the tendency greater with good

personal hygiene, the conclusion is justified that the mind can modify the course of disease in some measure and its symptoms in great measure.

In a summarized fashion: The mind cannot prevent life, influence the sex or the structure of the child, prevent infection, annul contagion, influence changes in organs, or make life everlasting.

Fear and worry as causes of pneumonia are so insignificant that they deserve no thought. The same statement is true of other infections.

That the mind can cure cancers, or limber up stiffened knees, or make blind eyes see, or change any of those conditions which are organic, is based on no evidence worth anything to the mind of a man accustomed to weigh evidence.

"THE HUMAN MACHINE"

Plato excluded from his Republic the men who were always busy dreaming of imaginary ills. This group includes others as well as the developed neurasthenics. If you will remember, Plato proposed a safe and sane republic, in which every citizen would be born and raised to a life of efficiency. There would be no drones, no incompetents, no defectives.

Plato's republic would be devoid of genius, because, as Galton has shown, genius and feeble mindedness are closely allied. There would be no dreamers, no poets, no artists.

On the other hand, laws and customs would be most logical and sane—the men would be level-headed; labor of every kind would be so productive, life would be so free from waste that two or three hours would be the working day and the balance of the time could be devoted to the pursuits of leisure.

Genius and dreaming are highly necessary, but the individual who departs from level-headedness misses genius and falls into the neurasthenia group pays more than his share for the community's opportunity. *Of the hundreds who get off the plane of level headedness, one is a genius and the balance are neurasthenics or other kinds of mental misfits.*

The sensible policy for any man to pursue is to work to keep in the level-headed group. Averaging things—that's where the best pay is; that's where the most happiness is; that's where the community most needs to have men.

Arnold Bennett has written a small book telling all about this matter of level-headedness. He has named this story "The Human Machine." It tells about the waste that comes from untrained brains, not brains that cannot read or write or figure, but brains that cannot take up a job, proportion the mental effort just right, do the job without worry or undue tension or over-effort, and then arrive at a sane, logical conclusion. That is what he means by untrained brains.

A part of the same subject is the uncontrolled brain that must run off in anger or in prejudice or in some other sluiceway. *It takes a good many pages to tell of the waste to the individual and to the public from untrained brains.*

"The Human Machine" goes even farther than that. It proposes that a man give thirty minutes a day to systematic efforts to get the brain under control. Efforts to hold the brain centered are like efforts to hold a pig tied

by the leg—first in this direction, then in that, but a constantly recurring effort to run away.

The thirty minutes a day set aside for the single task of getting mental concentration will result also in a more level-headed doing of the day's work.

If any reader gets this book, let him remember this. Reading it is not what is needed. Studying it, thumbing it, applying it—that's the thing.

There are those who assert that there are toxins of anger; that when a man is angry or violently excited new chemical compounds are formed within him and that these are powerfully poisonous. Observers have noted that men who have been violently agitated turned gray, had headaches and other pains and many different disorders. Experimenters have found that after anger certain secretions had a heightened toxicity. From this and a few similar bits of evidence they have patched together a theory of the "toxins of anger."

Under the influence of anger the brain may "run red." Stirred by strong emotion, there may be a temporary binding together of mental faculties, but, taking it all in all, all strong emotion makes for disharmony—a lack of co-ordination of mental faculties and a lessening sum total of mental activities—certainly of mental efficiency. As the result of the greater waste, more fatigue toxins are made, but they are fatigue toxins and not a special brand called anger toxins or emotion toxins. Mental tension burns tissue to ash, smoke, and waste, and emotional mental tension does all this without a proper return in effective work.

But, if there is no established scientific basis for the theory of anger toxins, there are some ways in which emotions disturb the body equilibrium. For instance, near the kidney there is located a gland called the adrenal. An increase in the secretion of this gland causes the small blood vessels to get smaller. A decrease in its secretion causes the muscles of these small blood vessels to lose their tone. Emotions influence the secretion of this gland. This much has been proven definitely.

Now, the blood is in the vessels and there it must stay. The blood is no more compressible than is the water in a hydraulic ram. Therefore, for instance, the vessels of the face dilate and a blush mantles the cheek; the extra blood supply there is compensated for by a diminished supply in some other organ. Emotion then substitutes for a physiological distribution of blood—the distribution best for the work in hand—one determined by the emotions—one not best for the work in hand. *Call it harmony; call it sparing the body from toxins; call it by whatever name you please, the fact remains that the body does its work best when equanimity prevails.*

HUMAN BETTERMENT ADVICE

The Massachusetts Society for Mental Hygiene issues a circular which I quote as it is, although with some items I do not wholly agree. For instance, if closely related people are of good stock, free from inheritable vices, they can marry with safety. Or, for instance, there are circumstances under which one feeble minded parent does not greatly hazard the offspring. Or, again, feeble mindedness is of as many degrees as drunkenness.

"Only the mentally and physically fit should beget and bear children.

"The marriage of closely related persons should be avoided.

"Children of grossly intemperate parents are liable to be imbecile or epileptic, and may inherit a nervous system unable to cope successfully with the conditions of our complex civilization.

"Children of feeble minded, imbecile, or epileptic parents are liable to inherit a constitution that tends to insanity; and may, though apparently normal, transmit to their children this predisposition; the liability is greater if both parents are or have been thus affected.

"Train your child to thorough cleanliness both of mind and body. Bad companions as well as common towels, common drinking cups and the like should be avoided, because there is danger of contagion both physical and mental.

"Give your child a variety of well cooked, wholesome food in ample quantity at regular intervals.

"Train your child to healthful habits of sleep in fresh air, giving opportunity for at least nine hours, and for more than that before the age of 12.

"Avoid conditions that tend to produce overstrain or precocity. *The special business of a young child is to grow, and to play with other children.*

"Give your child opportunity for a variety of wholesome activities and interests.

"Train your child to work hard in some regular occupation suited to his ability and talents, but to avoid extreme fatigue by alternation of work and rest.

"Train your child to give attention to the present situation and not to worry about the past or the future.

"Train your child to strict obedience in a few important matters, and let him alone in regard to other things.

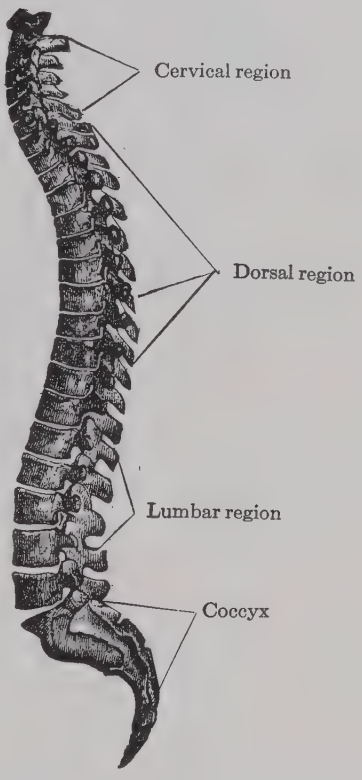


FIG. 147.—THE SPINE. Lateral aspect.

"Train your child to avoid drugs and stimulants of all kinds.

"Protect your child from shocks. Do not frighten him yourself or let other people do so.

"If your child becomes worried and sleepless, or has muscular twitchings, or the like, consult a competent physician at once."

The recommendations of the Massachusetts Mental Hygiene Society continue as follows:

"The best method of training is example; and what is good for your child is usually good for you.

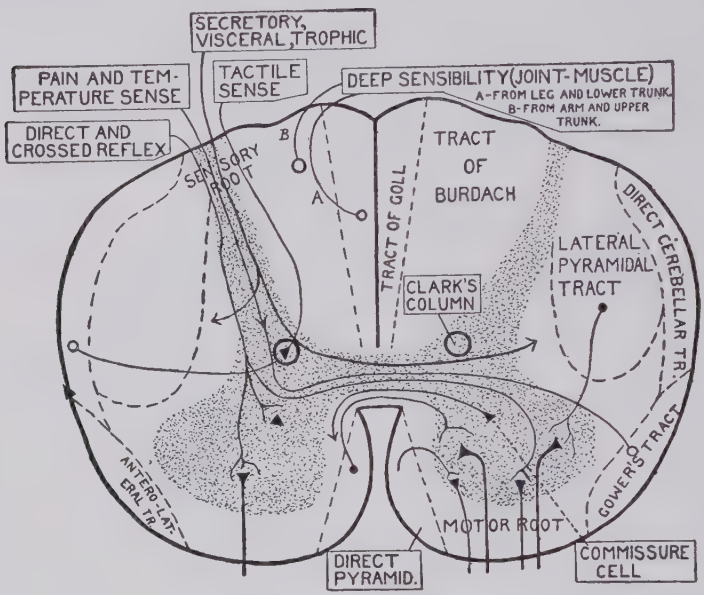
"Take advice of a competent person concerning the peculiar, sensitive,

or nervous child in order to correct a possibly bad inheritance by proper education and environment.

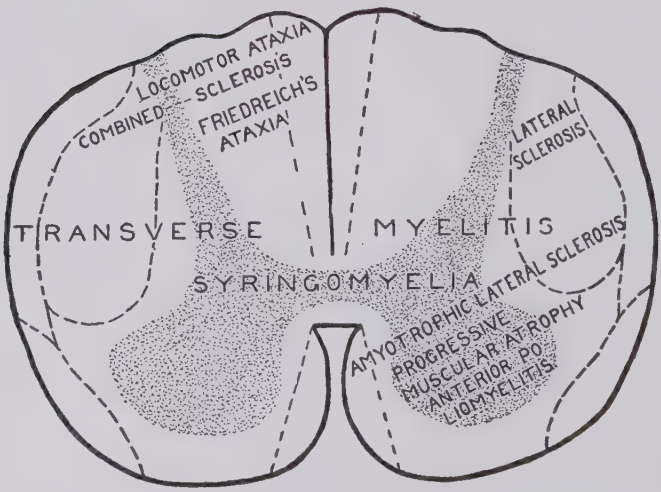
"The intemperate use of alcohol is a contributing or causative factor of several forms of insanity in the individual predisposed thereto.

"The habitual use of the habit-forming drugs, especially those of sedative and hypnotic type, may cause delirium or insanity.

"Remembering that syphilis, typhoid fever, scarlet fever, measles, tuber-



Anterior horns below; posterior above.



Anterior horns below; posterior above.

FIG. 148.—TRACTS IN THE SPINAL CORD. Location of certain diseases.

culosis, influenza, heart, kidney, and other diseases are not infrequently contributing factors in insanity or mental and nervous breakdowns, it behooves you to see that the health regulations of your community are kept abreast of modern standards of efficiency and to seek early a physician's advice when illness invades your home.

"A contagious and infectious germ disease, known as syphilis, is the direct cause of three kinds of brain disease, which represent at least one-tenth of the admissions to insane hospitals.

"Most of them are characterized by a progressive failure of mind and body, which ends in death in a few years.

"Syphilis has other ill effects on the individual, and may be transmitted to the next generation. Most cases of insanity caused by syphilis are incurable by any means now known to medical science.

"Do not allow diffidence or similar feelings to prevent you from promptly seeking competent medical advice concerning sexual, ethical, emotional, or mental problems which perplex you.

"*Remember that the mental equilibrium of many persons is endangered by the high pressure of our twentieth-century civilization—be thoughtful of them.*

"Try to get a little recreation every day, and a vacation oftener than once a year.

"Try to keep your weight up to that regarded as 'standard' for your height.

"Cultivate a cheerful, generous, and charitable disposition.

"There are many forms of insanity; a large percentage is preventable and a considerable proportion curable.

"Observe the few well established and simple rules of health concerning food, sleep, exercise, bathing, and recreation. Avoid alcohol, drugs, immoral living, venereal diseases, great mental or physical stress and excesses of all kinds."

CHAPTER XXII

Sympathetic Nervous System

Every structure in the body has nerves. Every nerve in the body connects into central. The nerves of such organs as the liver, kidney, lungs, and heart are known as the visceral nerves. They, too, connect into central. Whatever happens to them is telegraphed in over certain of these nerves, passes through two relay stations and finally rings a bell at central; impulses start out from central, pass through at least two relays and finally deliver the message to the organ.

As these nerves pass in and out they come in close contact with other nerves. In consequence we can sometimes learn something about some obscure organ by some sign that is more frequently displayed. Sometimes we can treat some less easily reached organ by applying this same principle. That is one door that is opening in what appeared to be a blank wall.

This sympathetic system is divided into at least two systems. Some of the component parts of these systems have been pretty well studied. The effects of action by these parts have been investigated, and medicines influencing them have been experimented with. That is the second door that is opening in this a-while-ago blank stone wall.

Probably you have noticed that in cleaning your ears with a hairpin you caused a slight fit of coughing. When one introduces a match into the ear canal and presses on a certain point on the floor of the canal, he feels an irritation in his bronchial tubes, and a cough results.

One of the causes of chronic, dry coughs is trouble in the external ear. The visceral nerves of the bronchial tubes have a nerve connection with the external ear.

The nose men discovered that in certain cases of asthma there were polypi in the nose. When these polypi were removed, the asthma got better. Then it was discovered that many cases of asthma got better if the nose was burned, though there seemed to be nothing wrong with the nose.

At first they said the burning should be done at certain spots. Then it was found that burning at most any point would give results. The explanation is that there is a nervous connection between the visceral nerves of the lungs and the nose.

When there is disturbance with the nutrition, ulcers appear in or around the mouth. A frequent kind is the small aphthous ulcer. The pain of this ulcer shows that it is not an ordinary sore, that it is a neuralgic affair. (Shingles is the best known neuralgic sore.) There is a connection between the visceral nerves of nutrition and the mouth.

DISTURBANCE AREAS

The nerves supplying the internal organs, after passing through one or more relay stations, reach the spinal cord. The centers for the different organs in the cord are sometimes close to and sometimes connected with centers for sensation or for motion in areas on the skin or superficial muscles. When an impulse comes in from some organ, that impulse overflows into some near-by center, and a painful sensation is felt at some point in the skin.

We have all heard of one-armed men suffering pain in the lost fingers. The pain is in some nerve high up or in the cord itself, but it is "referred" to the fingers. If there are no fingers there, it is easy to guess that the pain is higher up. When there are fingers and pain is felt in them, it is not so easy to prove that the seat of pain is elsewhere than where it is felt.

As the result of much study, Head and other investigators have found some areas to which internal organs are prone to refer their disturbances. Sometimes the disturbance expresses itself as a pain, sometimes as a muscular spasm, and sometimes as a local edema or swelling. Some of the more important of these relations are as follows:

Liver—In the back near the point of the right shoulder or under the shoulder blade; in the pit of the stomach at the end of the breast bone.

Kidneys—On the edge of the ribs a little above the level of the navel; in the small of the back; in the male genital organs.

Lungs—Anywhere over the chest; in a circle four inches in diameter around the navel.

Diaphragmatic pleura—Over the pleura; under the collar bone toward the shoulder in front; in the backbone just below the juncture of the neck and trunk.

Heart—In the left shoulder; down the left arm; over the heart and along the breast bone above the heart; occasionally in the pit of the stomach.

Uterus and tubes—In the nipple and breast; in the abdomen below the navel; on the top of the head; in the base of the brain; "in the spine," low down; in the thighs both front and back.

Pain in the legs due to disease of the uterus and tubes may be the result of pelvic pressure on the nerves as well as to impulses transmitted in the cord.

Ovary—The transmitted pains, the result of changes in the ovary, may run to the same areas as those from the uterus and tubes. Pain in the heel is one of the odd indirect results of ovarian disease.

Hip joint pain is frequently referred to the knee joint. The pain of disease in the lower vertebra is felt in the legs.

TO PREVENT NERVOUSNESS

It is important that a child should not come of neurasthenic stock, yet Oppenheim thinks that association with neurasthenic parents produces more neurasthenia than does inheritance. To save children from the "dangers of psychic infection in the parental environment," he thinks they should be removed from their own homes to better environments. "All these neurasthenic,

hysteric, worried, and fear controlled adults came up through childhood. In many of them their troubles could have been prevented had they had proper training in childhood."

The most important point is that the child be stimulated to play with other children. Nothing so helps a child to find himself as ordinary everyday, rough-and-tumble play.

On the subject of food, Barker of Johns Hopkins says: "The child that learns to eat and digest all wholesome foods and who is not permitted to cultivate little food antipathies makes a good start and avoids one of the worst pitfalls of life, namely, a finical anxiety concerning the effects of various foods all too likely to develop into a hypochondriacal state."

Barker thinks it important that the child should undergo a process of mental hardening. "Nothing can be more harmful than the gratification of caprice. Especially when a child shows a tendency to be nauseated by certain smells and tastes and to complain of noises or of sensitiveness to bright light, the family physician should be consulted and, provided no actual disease of the sense organs or brain is found, the process of psychic hardening should at once be begun."

The child must be trained to disregard these abnormalities by counsel and precept and also by discipline. If he is convinced that he is just like other boys, he will forget his caprice, for caprices are manifestations of an exaggerated ego. Pain and suffering have their place in the training. Unless a boy gets hurt occasionally in boxing, wrestling, aye, in fighting, he goes through life with an exaggerated fear of pain and suffering. The best way to rid him of this exaggerated fear, even of fear itself, is to have him get hurt occasionally.

Fear is powerful in its capacity for producing ill health, as well as for making men incapable. Barker thinks that the foundation for abnormal fears and timidity is laid by the practice of frightening children.

In Greece and Rome the children were frightened with stories of female demons. At the present time use is made of goblins, witches, ghosts, and "hants."

Children must be protected from such stories, and when through them morbid fears exist they must be trained into better mental states.

What is to be done with the child that flies into tantrums; with the child that, when it wants anything, cries and cries until he gets it? In the first place, if training is begun early and is properly carried out, the child will never develop into this type. If, through neglect, such habits have been developed, the habit of self-mastery must be substituted for emotional outbreaks, even though it be difficult.

The mother must ignore the temper, and, after calm has come, she must wait a while and then gratify the wish or request, if it is proper to gratify it. Not much Montessori in the plan, but it is proper just the same.

A striking symptom present in most neurasthenics is indecision. Sometimes obstinacy or explosive decision is the form that the vacillation takes. Some children of the "hair trigger" type need to learn deliberation. Some are given to fear, doubt, and indecision.

The parent can do much to help this latter group to a habit of decision.

This recommendation is much more in line with the Montessori method, since overcontrol is largely responsible for the fault.

Barker quotes a page from Arnold Bennett's "Human Machine," in which there is set forth the folly of blaming people and the wisdom of running one's own life and allowing others to run theirs. The pernicious habit of blaming the child learns from its parent.

The sensitive, nervous system of the child must not be overprotected. The policy of overprotection begets a capacity for keen suffering. Pouting, sulkiness, harboring a grudge and bearing malice must not be transformed into more persistent moods. Left to grow as weeds these lead to envy, suspicion, a morbid sense of neglect, and perhaps in time, to delusions of persecution and paranoiac states.

The habit of flying into violent tempers in older children can sometimes be broken by showing the child that he is making himself ridiculous. Even children have a horror of making donkeys of themselves.

Finally the article deals with the joy of work and its ability to bring health to the nervous. The education to idleness is education to nervousness.

INFLUENCE OF THE MIND ON DIGESTION

When the animal body was planned it was arranged that certain processes necessary for the growth and maintenance of the body and for the perpetuation of the race should go on without process of mind. There was economy in this in that it left the higher nerve centers to do certain other things. The functions over which the mind has little control are digestion, nutrition, circulation, respiration, and the growth and development of the unborn babe. Yet all of them are in some measure capable of being affected by the mind.

This is true of digestion. The understanding of the digestion may be said to have begun with the observations of Dr. Beaumont of Mackinac Island on Alexis St. Martin, a French Canadian, who had been wounded in such a way that the stomach secretions could be studied. Following Beaumont, investigations have piled discovery on discovery.

Recently a Russian, Pawlaw, has taught us a lot about digestion. One of the things which he has taught us is that, when the eye sees and the nose smells food, the mind goes to work and stimulates the stomach to secrete. I give just enough of this to make the point that what the mind can start it can stop.

Certainly 60 per cent of dyspepsia, indigestion, and stomach troubles is in the mind. Of the remaining 40 per cent, about one-half, 20 per cent, is the expression by the stomach of organic trouble located elsewhere in the abdomen, for while in telephone language the brain is "central," the stomach is an important "branch." Therefore, as Dr. Will Mayo puts it, "When the stomach telephone bell rings, one should always inquire, 'Who's talking?'" It may be brain, it may be appendix, it may be liver. When you get the feathers off the stomach diseases there is mighty little duck left, not over 20 per cent. In plainer speech, not over one-fifth of the cases of indigestion, "stomach trouble," "dyspepsia," are due to stomach disease.

A good stomach specialist is a good nerve specialist, a good mental therapist, a good "suggester"—for most stomach troubles can be cured by sensible eating (as to articles, quantity, and method), combined with mental therapy. It is said men dig their graves with their teeth. *Dyspepsia grows by what it feeds on. Most cases would get well if the subjects would eat simply—and forget.*

THE INFLUENCE OF MIND ON NUTRITION

Of course, the fat man is jolly and the thin man is a "born worrier." Can it be concluded from these truths that the mind influences nutrition and, carrying it a step further, that the mind can influence the nutrition of any particular organ, say the lung or a structure more under the will—a muscle of the arm?

Being fat or thin depends upon how much or how little fat or grease is slipped into spaces here and there. The deposition of fat in an organ is quite different from nourishing its cells. The food which the body takes up is used first to nourish the healthy cells, to repair wear and tear, and then the surplus is deposited as fat. The fat man has all of his organs nourished and some to spare. Therefore, he ought to be happy and he frequently is.

Many things work together to make a man thin. If he worries he burns up a lot of food energy and just the amount used in that way may mean that, in his ledger, his "fat" account shows more liabilities than assets. There is no doubt but that some men worry themselves thin. The way it is done is by the useless burning of food, not through any direct influence of the mind on the tissues. Fat is always a foreign body among the cells proper to the organ.

To influence the nourishing of the cells proper to any important degree is beyond the power of the mind. The mind can round out the arm. If a man eats and digests well and does not worry, he can increase, let us say, his biceps measurement. It increases because the surplus nourishment fat is deposited under the skin as fat. But no amount of thinking can make the biceps muscle have more fibers or grow larger ones.

Nourishment comes through use rather than through mind. This illustration applies to all the cells of the body. Mind influences the features greatly; it has not much influence on the essential tissues. The fact is that the frame of mind has little influence on the nutrition of those tissues that have work to do. Nor can concentration of the mind on any particular organ or its work in any material way modify its nutrition or its working.

A man can worry himself thin or, by being even-tempered, he can promote rotundity. But he cannot by any direct mind action increase the size of his muscles, or the state of his health or nutrition of his lungs, heart, liver, kidney or any other organ.

THE MIND AND THE HEART AND CIRCULATION

The rhythmical movement of the heart is automatically regulated. The size and carrying capacity of the blood vessels is also automatic, regulated

by the needs of the area for which each particular vessel carries. *God did not propose that a process as necessary as the circulation of blood should be controlled by so weak, vacillating, and incompetent an agency as the human mind.* And yet the fairly independent state called the circulatory apparatus belongs to the federation of states called the human body, and it must have its capital.

The brain, through the mind, can influence the heart and blood vessels in some degree. Blushing is frequently a mental process. That fact has always been recognized. And yet Darwin taught us that the capacity of the brain to dilate the blood vessels of the cheeks is highly developed as the result of special training, and the same change cannot be made in the blood vessels of other parts of the body, at least not to any considerable extent.

That emotion can make the heart beat fast or slow or irregularly everybody knows, but not even the most violent emotion can make a healthy heart stop beating. Sometimes the brain tries hard only to fail. Men go into cataleptic states, hypnotic conditions, major hysterical manifestations, with many functions suspended in whole or in part, but the heart beats away regular in its rhythm, neither faster nor slower.

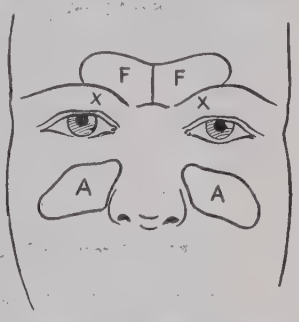


FIG. 149.—F. SITE OF FRONTAL SINUSES. A. SITE OF ANTRUM OF HIGHMORE. Pressure on the skin over these points may show tenderness in inflammation (sinusitis) in these cavities.

If a man has a heart disease the mind can make his heart asthma worse. If he has lime in his valves and palpitation is a result, dread, fright, and worry can make his attacks more frequent and more agitating. In other words, the mind can help in perpetuating a vicious circle, but when that is said there remains nothing else of consequence to say.

It is a long way from these manifestations to the curing or preventing of leaking heart valves or poorly nourished heart muscles. It is a long way from blushing or blanching of the cheeks to increasing or decreasing to any material degree the blood in, say, the kidneys or lungs.

INFLUENCE OF THE BODY ON THE MIND

How does the body influence the mind?

Man is not an individual. He is a community, consisting of millions of individuals called cells.

Some of these are doing nerve work—we call them brain cells; some are doing muscle work—we call them muscle cells. Nothing can affect Illinois without affecting Texas; nothing can affect one organ without affecting the other organs. The more one organ comes to being "central" for all the other organs the more it is affected by them.

On this principle the body affects the mind more than the mind affects the body. For one thing, it is "central"; for another, it is sensitive, it is delicately poised, it puts out a thousand "feelers," while the other organs are as oysters in their shells.

Let this statement stand out: The body affects the mind more than the mind affects the body.

When impulses travel from sick organs to "central" they stimulate more than the centers which immediately control them. New impulses spread from the new focus. The state of mind incited by a diseased organ may react to disease that organ further. A vicious circle is established.

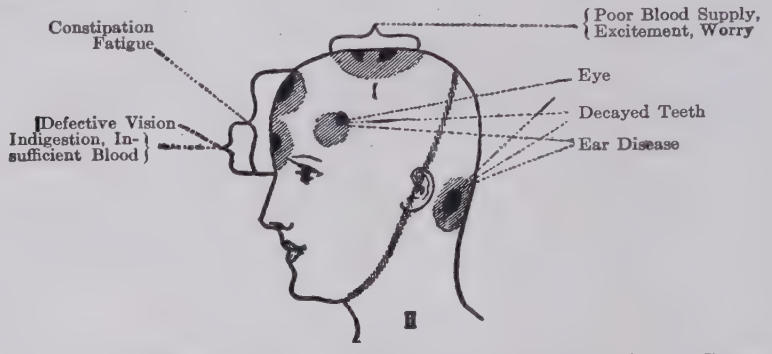


FIG. 150.—SHOWING LOCATION OF HEADACHES, ACCORDING TO THEIR CAUSES.

It is the fashion to call all sorts of things neurasthenia, to ascribe symptoms to a state of mind. That is good as far as it goes, but much harm will come unless the so-called neurasthenics are closely analyzed to eliminate those wrongly in the class, and also to find the organic basis, sometimes large and sometimes small, of many of the cases.

Pretty nearly everybody recognizes the dependence of mental and emotional states on conditions of health and disease. When a man's tissues are

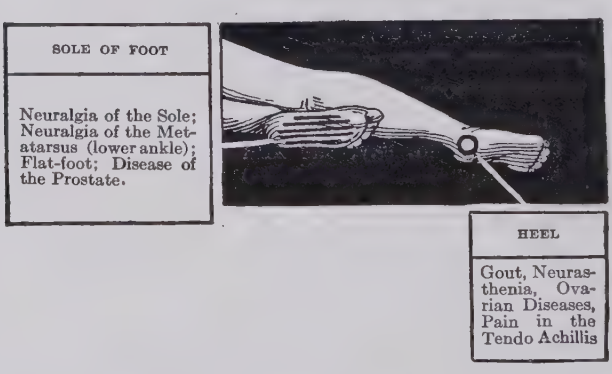

SOLE OF FOOT
Neuralgia of the Sole; Neuralgia of the Metatarsus (lower ankle); Flat-foot; Disease of the Prostate.
HEEL
Gout, Neurasthenia, Ovarian Diseases, Pain in the Tendo Achillis

FIG. 151.—THE POSSIBLE CAUSES OF PAIN IN THE FOOT AND HEEL.

nourished he takes a kindlier view of things, while, on the other hand, *the irritability of the dyspeptic is the offspring of his physical condition.*

Here we see a man able to conceive and carry out large enterprises, radiating vitality and dominating situations, because of his capacity to eat thick steaks and burn them into mental energy. There we see another—narrow, pessimistic, unjust, jaundice-eyed, incapable of inspiring others to action, as he is incapable of action himself, because of physical deficiencies. There is

a third man, he who is able to shield his mind from the influence of his body.

The greatest service which mental therapy, called Christian Science, or

PAIN OR TENDERNESS AT VARIOUS POINTS ALONG THE SPINE
Hysteria and Neurasthenia. Very much the most frequent causes of "backache," especially at the base of the skull; between the shoulders and at the base are fatigue and neurasthenia.
Other causes somewhat frequent are Pott's disease, spinal curvature, ulcer of the stomach, smallpox and other fevers.

FIG. 152.

some other name, has rendered society is in increasing the members of this third group. In teaching how to shield the mind against the body they are more successful than in curing the body through the mind.

THE MIND IN MENTAL DISORDERS

There is a group of people whose disorders are out of proportion to their physical bases. At one end of the line are the insane, at the other the self-centered; and in between there come the cataleptics, the hysterics, the neurasthenics, the neurotics, the alcoholics, and the drug fiends.

The insane have gross changes in their brain structure; others have very little. Generally speaking, the symptoms are out of proportion to the changes which are present. In all forms of insanity, except those advanced cases where the nerve structures are badly degenerated, music and pleasant surroundings as means of suggestion, supplemented by patient talks and counsel from those in attendance, are the best agencies for helping the patient to sane and calm moments.

In nearly all functional nervous disorders the symptoms are out of proportion to the organic changes. In hysteria, while authorities vary from the

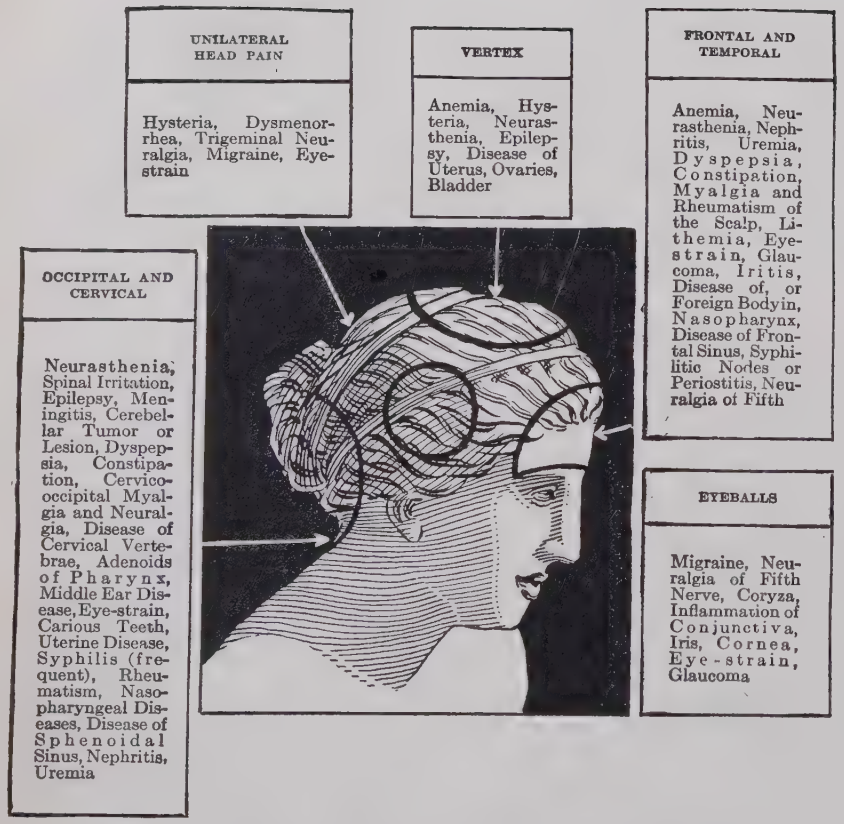

UNILATERAL HEAD PAIN
Hysteria, Dysmenorrhea, Trigeminal Neuralgia, Migraine, Eye-strain
VERTEX
Anemia, Hysteria, Neurasthenia, Epilepsy, Disease of Uterus, Ovaries, Bladder
FRONTAL AND TEMPORAL
Anemia, Neurasthenia, Nephritis, Uremia, Dyspepsia, Constipation, Myalgia and Rheumatism of the Scalp, Lithemia, Eye-strain, Glaucoma, Iritis, Disease of, or Foreign Bodyin, Nasopharynx, Disease of Frontal Sinus, Syphilitic Nodes or Periostitis, Neuralgia of Fifth
OCCIPITAL AND CERVICAL
Neurasthenia, Spinal Irritation, Epilepsy, Meningitis, Cerebellar Tumor or Lesion, Dyspepsia, Constipation, Cervico-occipital Myalgia and Neuralgia, Disease of Cervical Vertebrae, Adenoids of Pharynx, Middle Ear Disease, Eye-strain, Carious Teeth, Uterine Disease, Syphilis (frequent), Rheumatism, Nasopharyngeal Diseases, Disease of Sphenoidal Sinus, Nephritis, Uremia
EYEBALLS
Migraine, Neuralgia of Fifth Nerve, Coryza, Inflammation of Conjunctiva, Iris, Cornea, Eye-strain, Glaucoma

FIG. 153.—THE GENERAL DIAGNOSTIC INDICATIONS TO BE DERIVED FROM THE SEAT OF PAIN IN THE HEAD AND FACE.

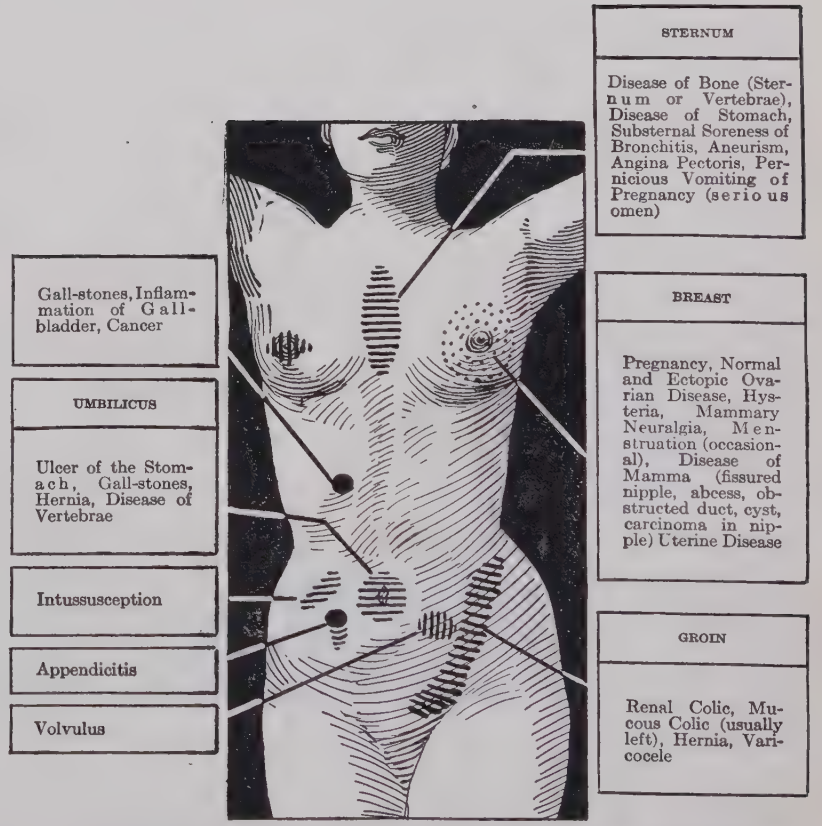

STERNUM
Disease of Bone (Sternum or Vertebrae), Disease of Stomach, Substernal Soreness of Bronchitis, Aneurism, Angina Pectoris, Pernicious Vomiting of Pregnancy (serious omen)
Gall-stones, Inflammation of Gall-bladder, Cancer
BREAST
Pregnancy, Normal and Ectopic Ovarian Disease, Hysteria, Mammary Neuralgia, Menstruation (occasional), Disease of Mamma (fissured nipple, abcess, obstructed duct, cyst, carcinoma in nipple) Uterine Disease
UMBILICUS
Ulcer of the Stomach, Gall-stones, Hernia, Disease of Vertebrae
Intussusception
Appendicitis
Volvulus
GROIN
Renal Colic, Mucous Colic (usually left), Hernia, Varicocele

FIG. 154.—THE POSSIBLE CAUSES OF PAIN IN VARIOUS PARTS OF THE BODY.

group who think the generative organs have little to do with it, to Freud and his school, who think they have much, they all unite on the ground that the symptoms, as expressed, are out of proportion to the organic changes.

In neurasthenia, as a base there is usually some overtire, or, maybe, some

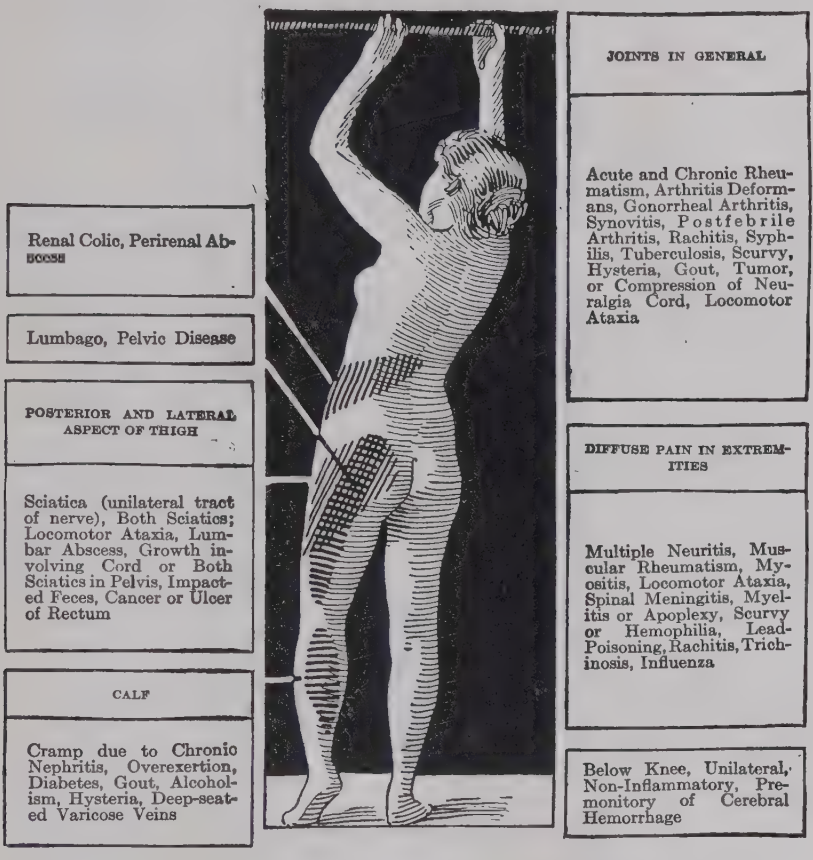

Renal Colic, Perirenal Abscess
Lumbago, Pelvic Disease
POSTERIOR AND LATERAL ASPECT OF THIGH
Sciatica (unilateral tract of nerve), Both Sciatics; Locomotor Ataxia, Lumbar Abscess, Growth involving Cord or Both Sciatics in Pelvis, Impacted Feces, Cancer or Ulcer of Rectum
CALF
Cramp due to Chronic Nephritis, Overexertion, Diabetes, Gout, Alcoholism, Hysteria, Deep-seated Varicose Veins
JOINTS IN GENERAL
Acute and Chronic Rheumatism, Arthritis Deformans, Gonorrheal Arthritis, Synovitis, Postfebrile Arthritis, Rachitis, Syphilis, Tuberculosis, Scurvy, Hysteria, Gout, Tumor, or Compression of Neuralgia Cord, Locomotor Ataxia
DIFFUSE PAIN IN EXTREMITIES
Multiple Neuritis, Muscular Rheumatism, Myositis, Locomotor Ataxia, Spinal Meningitis, Myelitis or Apoplexy, Scurvy or Hemophilia, Lead-Poisoning, Rachitis, Trichinosis, Influenza
Below Knee, Unilateral, Non-Inflammatory, Premonitory of Cerebral Hemorrhage

FIG. 155.—THE POSSIBLE CAUSES OF PAIN IN VARIOUS PARTS OF THE BODY.

organic diseases, but what constitutes a neurasthenic is an exaggeration of his disorder—for instance, making over a capacity for being easily fatigued into a virtue instead of a vice, believing in it, bowing down to it, and trying to persuade others to do the same.

Neurasthenics and hysterics being largely mind caused, the main line of cure must be mind cure. To relieve them the underbrush of malnutrition, constipation, anemia, poor physical development, underoxidation must be cleared away so that hypnotism, suggestion, auto-suggestion, faith cure, and mental training may have a chance to chop the trees.

The function of hypnotism is to give relief, but, wisely done, it can be used to train to self-dependence. The greater advantage of the analytical

method employed by the Freud school, the mixed suggestion and mental training of Du Bois, the psychology of Christian Science, and that of mental therapy is that they have power to beget self-dependence, independence of others.

They help a man to see himself as he is, not as he thought himself to be. But seeing is not enough. To see and stop there leads to still greater helpless-

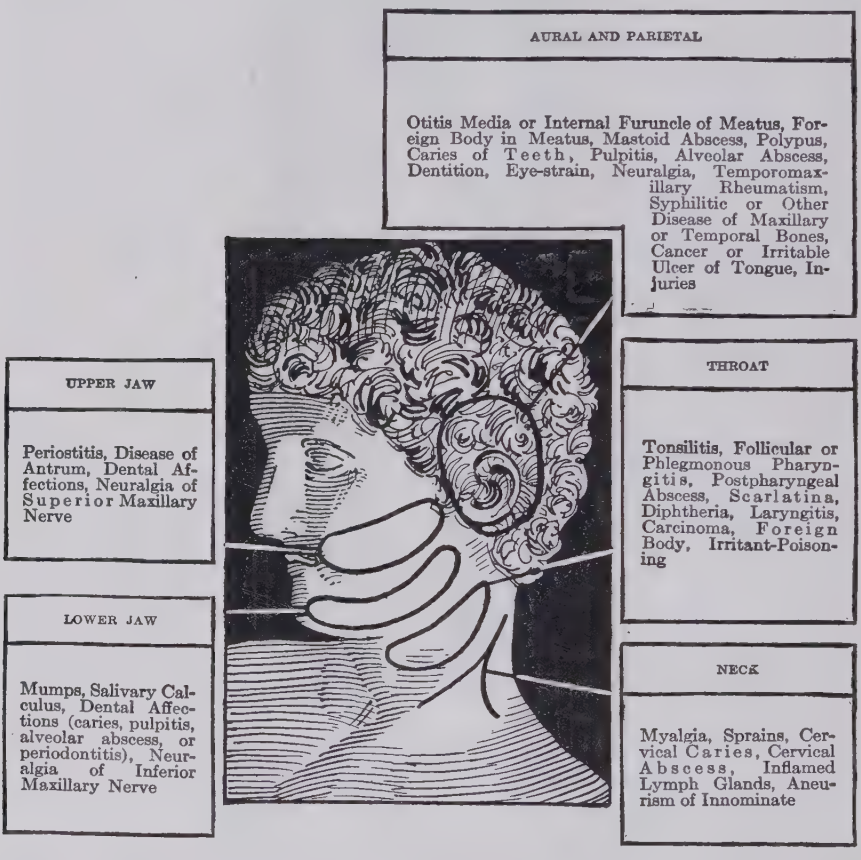

AURAL AND PARIETAL
Otitis Media or Internal Furuncle of Meatus, Foreign Body in Meatus, Mastoid Abscess, Polypus, Caries of Teeth, Pulpitis, Alveolar Abscess, Dentition, Eye-strain, Neuralgia, Temporomaxillary Rheumatism, Syphilitic or Other Disease of Maxillary or Temporal Bones, Cancer or Irritable Ulcer of Tongue, Injuries
UPPER JAW
Periostitis, Disease of Antrum, Dental Affections, Neuralgia of Superior Maxillary Nerve
THROAT
Tonsilitis, Follicular or Phlegmonous Pharyngitis, Postpharyngeal Abscess, Scarlatina, Diphtheria, Laryngitis, Carcinoma, Foreign Body, Irritant-Poisoning
LOWER JAW
Mumps, Salivary Calculus, Dental Affections (caries, pulpitis, alveolar abscess, or periodontitis), Neuralgia of Inferior Maxillary Nerve
NECK
Myalgia, Sprains, Cervical Caries, Cervical Abscess, Inflamed Lymph Glands, Aneurism of Innominate

FIG. 156.—THE GENERAL DIAGNOSTIC INDICATIONS TO BE DERIVED FROM THE SEAT OF PAIN IN THE FACE AND NECK.

ness. Where relief is permanent it is through mental training. The hysteric may be temporarily relieved by hypnotism, but, if she stop there, she has renewed attacks. The drunkard (all drug fiends are neurotics) may be cured by suggestion (called cured), but if he stop there he will "fall from grace."

All neurasthenics who would be cured must patiently, persistently, courageously work out their own salvation, helped by competent trainers, build up a resistance to fatigue, cure self-centering by broadening their interests, gain calm and an abiding optimism.

PERSISTING NEURALGIAS

Had the inventor of the submarine cable been an anatomist, he would have saved himself a lot of trouble. He could have studied a nerve and had a working plan for his cable. As it was, he probably puzzled his brain for years over the plan, using for his planning brain cells and nerves built exactly as a cable is built—nerves built on the proper plan.

PRECORDIAL REGION
Angina Pectoris (radiates down left arm), Pseudo-angina (aneuric, gastric, neurasthenic, grippal, toxic), Functional Disorders of the Heart, Valvular Defects (aortic in particular), Gastralgia (cardialgia), Gastritis, Poisoning by Arsenic, Flatus in Splenic Colon, Anemia, Hysteria, Epilepsy, Locomotor Ataxia (more common in axilla)
Colon, Diaphragm
LEFT HYPOCHONDRUM
Impacted Splenic Colon, Colitis, Gastritis, Gastric Carcinoma, Gastric Ulcer, Dilated or Prolapsed Stomach, Enlarged Spleen (Malarial Leukemic), Renal Colic, Exercise, Anemia, Acute Rheumatism (especially in children)
LEFT ILIAC
Colitis, Impacted Sigmoid, Hernia (Patulous Internal Ring), Varicocele, Ovaritis, Mucous Colic

Fig. 157.—The Possible Causes of Pain in Various Parts of the Body.

I presume that, occasionally, a telegraph operator will transmit an inquiry about something that he, the operator, could inform both the sender and the recipient of. But his duty is to transmit, and he holds his peace. I can imagine the nerves in the inventor feeling about it about like the operator does.

In the center of the nerve is the wire that runs from the sending office as a continuous unbroken cord. Around this is a lot of insulating, and around the insulation is the wrapping for strength and protection. The impulse travels from the center to the muscle to be moved.

In the spasmodic disorders so frequently noted, the seat of the trouble is not in the jerking muscle nor in the nerve which makes it jerk. The impulse is transmitted, unchanged, from some nerve cell, and the muscle jerks because it is powerless to disobey orders—which makes plain the absurdity of treatments directed to the muscle or even to the nerve in its course.

An old book directed that, when a baby's head was jerking in convulsions, it should be held still. The absurdity of such a plan anyone can see. As nobody would be so foolish as to believe it, nobody is so foolish as to advocate it.

However, though the curtain is lifted and the imagination makes us see beyond the jerking head, it is not wholly lifted. We are still prone to stop short of the center where the trouble is starting and prone to forget that back of the disturbing cell lies that which has disturbed the cell.

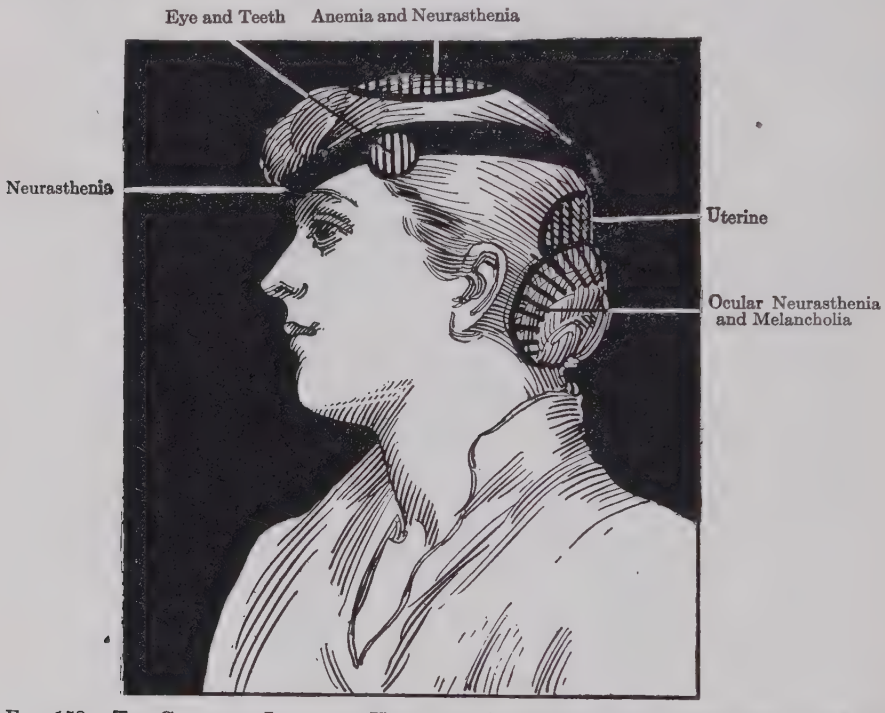


FIG. 158.—THE CAUSES OF LOCALIZED HEADACHE, ACCORDING TO THE EXACT SITE OF THE PAIN.

Failing in other and better measures for control, the surgeon steps in and cuts the nerve.

At once the jerk stops, or the pain stops, if pain were the trouble. Or he kills the nerve by injecting alcohol into it.

No external expression of the nerve cell change can be given, but back of the cut the nerve cell change goes on.

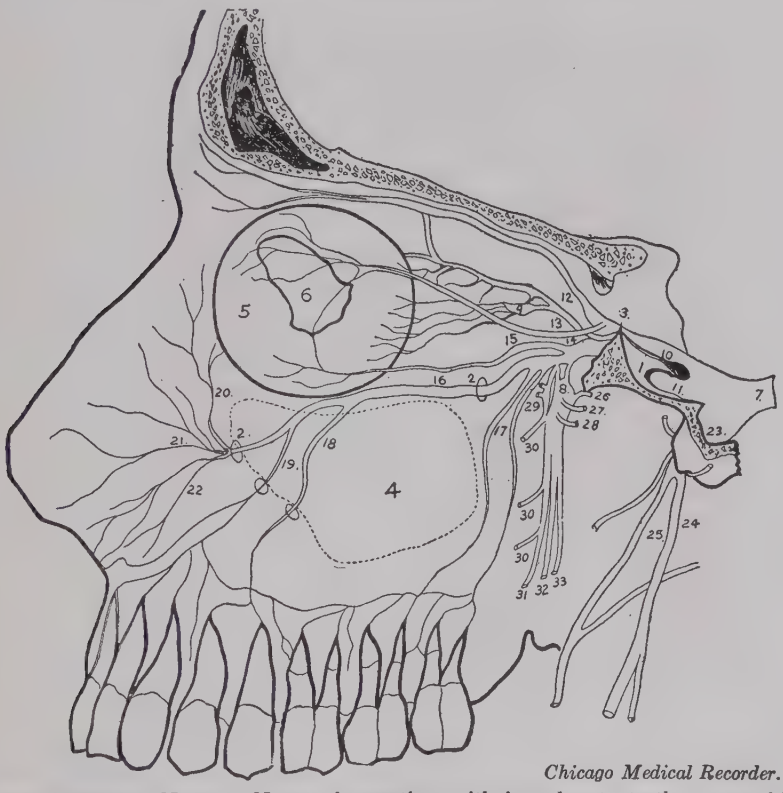
The methods of cutting the wires with the knife and with alcohol injection replaces an older, less efficient, and much more harmful method. It was the drug method—the use of alcohol, or morphin, or cocain.

These acted like nippers in cutting the nerve. The cut was not a permanent cut. In a few hours, the line had been repaired, and down it telegraph messages were going again.

Again, unlike the act of the nippers, the cut was not a clean one. Morphin, cocain, and alcohol, in their efforts to cut the line, smash things generally. They lay out all the cells reached by the blood and amenable to them. It is from this action drug habits are born.

The use of sedative drugs is born of a partial view, not so foolish as holding a baby's head for fits, but nearly so.

A sufferer from a persistent neuralgic pain should try to locate the cause of his trouble and remove it. The cause may be connected with the nerve itself—a pressure, for instance. It may be on some other nerve. The pain is reflex. It may be due to absorption of infection from some distant area—the teeth, tonsils, nose, gall bladder, appendix, prostate, fallopian tubes.



Chicago Medical Recorder.

FIG. 159.—TRIFACIAL NERVE. Nerve of sensation, with branches to teeth, nose, orbit and sinuses in the upper jaw showing.

If relief cannot be secured in this way the question of relief by cutting the wires comes up. Is it better to suffer the pain than to suffer the remedy? If it has been decided that the pain is the worse evil the question comes up: Shall the cable be put out of commission by the knife or by injection of alcohol or a similar drug into the nerve, or shall it be done by the use of morphin or other drugs? The answer is: Do not use habit-forming drugs to relieve persisting neuralgias.

NEURALGIA

The men who analyze the origin of words tell us that neuralgia means nerve pain. Following out this general idea we call those cases

neuralgia in which there is pain but no other evidence of disease in a nerve.

Perhaps about as good a way to divide neuralgia from neuritis is by calling neuralgia all those cases in which the pain comes and goes. If the ache is steady day and night for weeks, months, or years, the probability is that if we looked at the nerve we would find it inflamed—neuritis. If the pain comes and goes the probability is that if we got the nerve out and examined it with the unaided eye we would find nothing abnormal. Such cases we call neuralgia.

The pain in neuralgia is paroxysmal. It gets much better and much worse, or disappears and reappears. Sometimes it occurs with clocklike regularity. Such periodicity in neuralgia may be due to malaria. More frequently it is not. The pain is apt to shift from place to place. It comes on suddenly and is apt to leave just as suddenly. While the pain is deep, the skin over the painful areas may become tender. In some cases of neuralgia the skin swells as in nettle rash. In others blisters and sores appear; for example, shingles.

It is in this disease that painful points or tender points are found. In neuritis the nerve is tender along its entire course. In neuralgia there may be one or more tender points along the nerve, or where it comes out of the spine or where it crosses some bone. The one outstanding symptom in neuralgia is pain. A nerve of sensation is disturbed and it is crying out in the only terms in which it is able to talk.

What is to be done about it? Naturally, the first call is for relief from pain. This is where the chiropractor, osteopath, and masseur come into their own. They find these tender points, and in many instances, by manipulating them, relieve the pain. It is natural for neuralgic pain to stop suddenly, and there is every reason to think that skillful massage and manipulation of the muscles, bones, joints and ligaments can bring relief in some of these cases, though no one can tell in advance which cases can be relieved.

The physicians who give medicine have many drugs in their quivers. Preparations of opium, morphin, and codein should never be given. The danger of habit is too great. Some people take whisky for neuralgia. Though physicians cannot be blamed for that practice, possibly some would say that alcohol as a neuralgia remedy belongs in the physician's quiver. Alcohol should not be given in neuralgia for the same reason that morphin is forbidden.

Among the effective drugs which do not produce habit are acetanilid and other coal tar preparations, salicylates, gelsemium, cannabis indica, and aconite. None of these should be given except for short periods, and then only under physicians' control. A drug powerful enough to do good is powerful enough to do harm.

The matter of relief having been attended to, the question arises: What is behind the pain? The answer is more important than the answer to the cry for relief. Malaria may be the underlying cause. Or it may be alcoholism, diabetes, lead poisoning, syphilis, gout, rheumatism, or Bright's disease. It may be that the neuralgia is really an expression of central disease—for instance, locomotor ataxia. It may be some local cause, such as a diseased tooth or a diseased ovary. In every case treatment must include

treatment of the underlying cause. Neuralgia is never anything more than a symptom.

SCIATICA

Stedman defines sciatica as sciatic neuritis, neuralgia of the sciatic nerve, felt at the back of the thighs and sometimes running down the calf of the leg. The sciatic nerve is the great nerve trunk of the leg. In the public mind any pain in the leg not located in a joint is known as sciatica. In many cases thought to be sciatica the pain is not even in the nerve trunk. In many others the pain is in the nerve, but the seat of the trouble is elsewhere.

In the *Medical Record* Dr. Hunt classifies cases of sciatica into four groups: There are the cases of sciatica in which the pain felt in the nerve is the result of pressure on the nerve at the point where it comes away from the spinal column. Injury to or disease in the bones of the lower end of the spinal column, or damage to the joint which joins the spine to the hip bones, affects the sciatic nerve and causes pain to be felt in the leg.

Second, pressure on the nerve in the pelvis by a tumor, a pregnant uterus, or a distended bowel causes a neuralgia in which the pain is felt in the leg rather than in the pelvis. To the causes belonging in these two groups may be added the cases of sciatica in which the real trouble is disease of the hip joint. In these cases the injury to the nerves of the hip makes itself felt in the leg.

Third, constitutional states such as syphilis, alcoholism, diabetes, and malaria.

Fourth, damage to the nerve trunk from injury or exposure to cold.

Plainly, the man who thinks he has sciatica and who wants to be rid of it should first find out what his trouble is. He should make certain the pain is in the nerve and not just somewhere in his leg. Next, he should investigate the possible conditions elsewhere in the body capable of causing pain in the sciatic nerve. What he is to do depends on what he finds. If the trouble is a broken arch he must treat his feet. If the hip joint is responsible treatment must be directed there and not to the nerve. If the pain is due to spinal cord disease, for instance locomotor ataxia, little is gained by treating the nerve. If the pain is the result of conditions in the pelvis attention must be directed to the organs in that locality. If syphilis, malaria, or diabetes is the cause the underlying disease is to be treated. Some men are called upon to choose between alcohol and sciatica.

Neuritis—Neuralgia.—*M. B. M. writes: "Can you tell me of some permanent relief for neuritis? I have doctored for it for fifteen months, taking medicines, hot water applications, and rubbings. Nothing seems to effect a cure. My right arm and across my neck seem the most affected and at times the pain is almost unbearable."*

Reply.—Your disease may be neuralgia. The fact is, I think it is neuralgia. A pain which just scatters around generally across the neck and down the arm is very apt to be neuralgia rather than neuritis.

Neuralgia means pain in a nerve. Neuritis means inflammation of the

nerve. In neuritis the pain is located in the affected nerve. It sticks there rather closely. It hangs on steadily day and night for some time. In neuralgia the pain comes and goes. In neuritis the inflamed nerve is tender.

You are suffering from pain in your neck and arm. You have had this for fifteen months and hot water bottles and rubbings have not relieved you. Why? For one thing, you may be absorbing bacteria constantly from bad tonsils or bad teeth. If so, you will not get well until your teeth or tonsils are cleaned up.

Another possibility is pressure from a bursa somewhere in your neck or shoulder. Again, there may be pressure on the nerve from an extra rib, one located about where the neck joins the body. Both neuralgia and neuritis are caused by the above causes, and so long as the cause persists there is no need in splitting hairs over names. Then again, your trouble may be due to lead poisoning or alcoholism.

How are you to know whether you have neuritis or neuralgia? In neuritis the pain is rather steady day and night. In neuralgia the pain comes and goes. In neuritis the course of the inflamed nerve can be made out by the tenderness on deep pressure. Sometimes the tender nerve can be felt with the fingers. In a neuritis which has lasted sixteen months it will be found that the muscles supplied by the inflamed nerve have shrunken. An examination with electricity will show that the muscles are degenerating.

Let us suppose that you have neuritis. What can be done about it? First, you must look for and try to remove the cause. Unless you can remove the cause you will not make much headway with the cure. In giving relief care should be exercised that drug habits do not result. A drug habit is worse than neuritis.

There is not much chance of relief from osteopaths, chiropractors, and masseurs. If the case is obstinate by all means try them, but do not be disappointed if you fail to get relief. Salicylates, iodids, acetanilid, gelsemium, and other neuralgia medicines may give relief, but they probably will not. Rest and electricity and light therapy offer more hope of relief of pain than do any other agents.

While this was being written a man told me of his experience. He had had neuritis for four months when he broke a tooth and went to see his dentist. The dentist X-rayed his mouth and found that two crowned teeth which seemed healthy were decaying in their deeper parts. The teeth were drawn. His neuritis got well at once. He also had a slight albuminuria. This disappeared after the teeth were pulled.

Adjust Your Mind.—*A. J. W. writes: "I have had considerable trouble in sleeping. I can sleep, but I dream all night, hence I am not fully rested in the morning. Would a tablet of sodium bromid, ten grains, have any bad effect on the heart if taken nightly?"*

Reply.—Ten grains of bromid at night will not affect your heart, but it will not help you to sleep, except it help you by suggestion. You are not justified in taking bromid or any other medicine to make you sleep. No one is ever justified in taking sleeping potions on his own responsibility. When one gets in the proper frame of mind to sleep he sleeps.

Everybody dreams all night. There is nothing wrong about that. Maybe you are not rested in the morning because you sleep too long or in a badly ventilated room. Maybe you worry about your sleeping.

To sleep, fix your room right, and then go quietly to bed to sleep, if you can; to rest, if you cannot sleep. When you go to bed in that frame of mind you will sleep.

Thinking Disease.—*A woman writes: "I have come to believe there are a lot of people who think so much of sickness, especially tuberculosis, that they think themselves into disease, whereas if they had more to keep their minds busy and not think and listen to others trying to tell them they have such and such disease they would sleep better and live longer."*

The writer quotes this statement from a magazine:

"Many have contracted consumption and died of it simply because they thought they would die of this disease because their parents did."

REPLY.—Your advice to think of other things than disease is excellent, but you are mistaken in saying that to think consumption will cause it. Thinking collision never made trains collide. It's getting on the wrong track or the wrong schedule that does that. Thinking consumption never made consumption. It is living wrong that does that. Your position on that point is as wrong as is the position of those you criticize. Live right and then let consequences come. The consequences will be right.

Has Poor Memory.—*L. A. W. writes: "I am married, 30 years of age, and a traveling salesman. My health is good. In my work it is necessary to do a great deal of memorizing and it seems impossible for me to remember. Is there anything I can do to remedy this trouble? Can you suggest any treatment or anyone to whom I may turn for help?"*

Memory can be greatly benefited by training. To train one there are memory schools and correspondence courses. See the advertisements in papers and magazines.

Nervous Indigestion.—*H. B. writes: "Can you suggest a cure for nervous indigestion? As sleeplessness is a feature of the case, what is the best food to be eaten at the evening meal? The case has been in the hands of a physician, but he frankly says he does not know what else to do."*

REPLY.—You will not make much headway trying to cure sleeplessness or nervous indigestion by a diet. Simple, light meals eaten slowly and calmly will help, but to try to divide foods into this you shall eat and this you shall not eat will not help you much. Above all, eat a simple, light supper. This is about as far as you can go in the diet cure of either nervous indigestion or sleeplessness. Both are conditions of mind. Find someone who can teach you mental control—how not to be stomach-centered or sleep-centered, or tense, and who will then teach you to live on light, simple meals, and you will find a cure.

May Imagine Illness.—*B. R. S. writes: "Last January I was taken by nervous prostration and it is so I can't sleep without a vegetable to make me. I have been to seven doctors. What do you recommend? I am getting desperate."*

REPLY.—As you have been to seven doctors, and none has found any organic trouble, you probably have none of great consequence. Nervous prostration under these circumstances is the result of bad mental habits. When these are corrected the nervous prostration gets well. To start with, taking something to make you sleep is a habit that must be corrected. Some men can get themselves in hand by reading books on nerves, of which

there are many. Some need mental healers, of whom some varieties are in the medical profession and some outside. Baths, massage, electricity, exercise, and tonics are aids. The essential treatment is to be directed to the mental habits.

Nervous and Run Down.—*A. M. writes: "I am run down from overwork and am thin and weak and nervous. I have been advised to take*

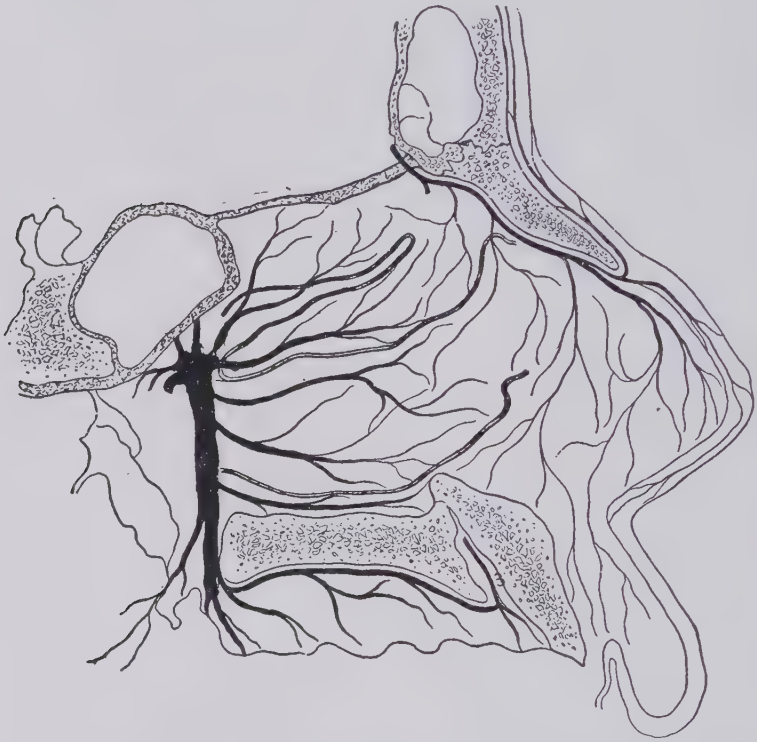


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FIG. 160.—NERVE OF SENSATION TO THE SOFT PALATE, THE TEETH, THE NOSE, THE EYE, ORBIT AND THE SINUSES OF THE UPPER FACE.

three-grain hyponuclane tablets to enrich the blood and make me strong and healthy. Is there any harm in taking these tablets?"

REPLY.—I have not been able to find out what this tablet contains. It is not likely to hurt you. It may not help you much without feeding, plenty of sleep, and plenty of open air. Don't you think these will fatten you up and rest you?

Should Go to Sanitarium.—*Interested Reader writes: "I have a friend who is, I think, affected with neurasthenia. He is a man of about 40 years of age, of unusually fine mind, and temperate in every way. He has an idea that he is going to die and always says he is afraid of death. He complains of a dreadful pain in his head and says he thinks it will burst and that will be the end of him. He lies down a good deal in a dark room. Sometimes, when you tell him to get up, he says he is suffering so that he can't move and that he is afraid his back will break. I think, of*

course, this is all imaginary, but it seems to be real to him. He is despondent. Doctors do not do him any good. How should he be treated—that is, should he be talked to severely or should we sympathize with him? He has had to give up his business, of course, and it is too cold for any outdoor exercise. He complains a great deal of not sleeping. Please advise something that can be done for him at home. I know he seems better as long as he is occupied, but he is not capable of doing a great deal—at least he thinks he isn't; and he seems nervous and clenches his fists and has a most distressed expression."

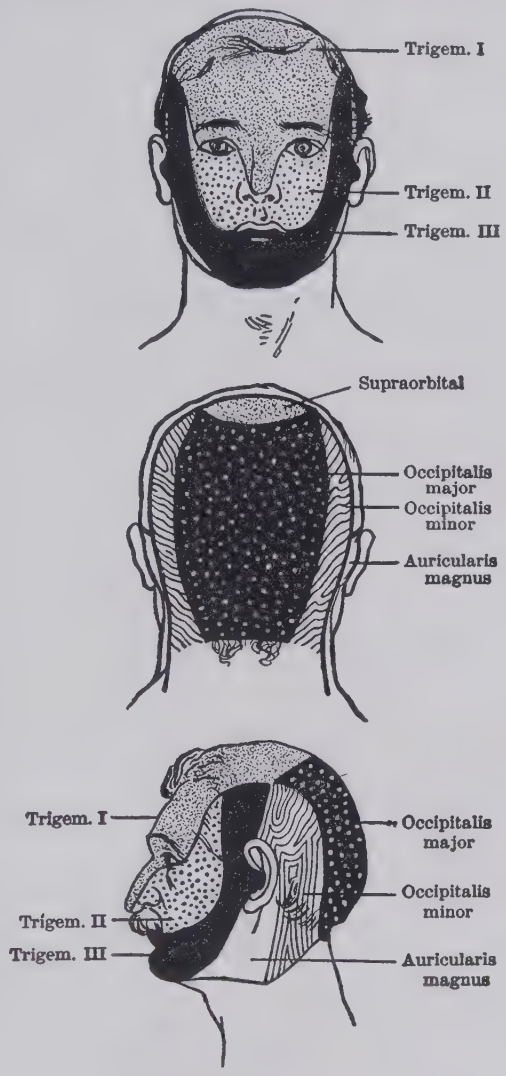


FIG. 161.—DISTRIBUTION OF NERVES OF SENSATION OF THE HEAD.

REPLY.—The above description is that of an individual with an excessive neurasthenia—almost beyond the limits of that condition. Ordinary medicine and ordinary medical service will not help him materially. He needs mental training and psychotherapy. He may be able to accomplish what he needs at home, but prolonged sanitarium treatment will be much more promising.

Have Him Examined.—*R. D. writes: "I have a son who is 20 years old, 5 feet 6 inches tall, weighs 115 pounds, and is strong for his weight. He eats well and sleeps well, but doesn't like to get up in the morning. He doesn't feel tired, but listless and drowsy—more so in hot weather. He lost interest in school at the age of 14 years. Nothing seems to interest him and he doesn't care for company, especially where there are women and girls. He has a poor memory and cannot keep his mind on anything. He has no confidence in himself. He won't look for work, but will work if someone gets it for him. He sits around with his head hung down in his hands and at times he thinks someone is going to hurt him. As I am anxious for his welfare, any advice you give me will be greatly appreciated."*

REPLY.—The boy is in need of help. Have him examined as to his nerves and mind condition right away. If he is off mentally he should have care in an institution. If he is temperamentally off, as frequently happens with boys at his age, he needs somebody to get him out of himself and interested in something. He needs both mental and physical training and interests.

Boy Needs Control.—*Mrs. S. L. P. writes: "I have a son who first showed symptoms of hysteria in his thirteenth year. He would lie for hours in a seizure. When this condition was recognized the seizures were stopped in a short time. It is seven months since one appeared. He is now 16 years old. His disposition is not good. His will power is not strong, only in his own way. His family affection seems to be lost. What is the cause? Is the condition apt to come on again? Do habits that are not good—for instance, deception, or picking up others' money, or willfulness—develop? Will one recover entirely from this?"*

REPLY.—Habits of deception, willfulness, and lax ideas of honesty are apt to develop in the wake of the condition noted. Fortunately, most of the mental and nervous disorders that develop during adolescence tend to remedy themselves. After the individual has readjusted himself the kinks disappear. Wise guidance and help in which sympathy and judgment are properly blended are of the greatest service.

Study your boy and try to get for him the schooling and control he needs. Perhaps you can get helpful suggestions from Hall's "Adolescence."

Has Sudden Fears.—*O. J. S. writes: "Please explain what causes me to be extremely nervous at times, making my heart beat abnormally. Occasionally a sudden fear comes over me when I am alone. I feel scared, as if something were going to happen to me. I have been in this condition for four weeks, and have lost four pounds during this period. I am weak, yet my appetite is good and I sleep well. I am unable to work at my trade as a carpenter. I am 29 years of age, weigh 144 pounds, and am about 5 feet 10 inches tall. I have worked steadily and hard all summer."*

REPLY.—It is possible you have an organic disease. Go to a capable physician and have an examination made. If he tells you that you have no organic disease, and he probably will, then proceed to get control of yourself. You have worked and worried too hard and are tired. It is easy to worry off four pounds in four weeks.

Go back to your trade. Carpenter work is good for neurasthenia. If you cannot govern your mind and banish these fears by yourself, some one of the books on nerves may help you. If you try a book, you must study it. Casual reading is not enough. You may need the services of a psychotherapist.

Needs Mental Treatment.—*A. O. writes: "A young lady of my acquaintance has been, or appears to me to have been, mentally unbalanced for several years. These are some of her actions: She is highly nervous and will get extremely angry at times when others are not thinking of such a thing. She will throw knives or anything she gets hold of into the wall, or shove the dishes on the table, or slam the doors. She will jump up of a sudden and slam things on the floor and threaten to knock people over or to gouge their eyes out. She is of an exceedingly jealous nature,*

and has an evil look when in these spells. She is also forgetful. She has a brother in an insane asylum and her father's family seems to have insanity among the members. Does she inherit it from him, and can she be cured? She also takes spells of laughing and seems unable to control herself. Is there danger of her doing any harm to those about her when in these spells? What in your opinion is the matter with her?"

REPLY.—In spite of the insanity in this girl's family I should not judge from your letter that she is insane. I do not think she will harm anyone. That does not mean that she does not need mental treatment.

A few weeks in an institution should enable the girl to get herself under control.

Relaxing Body and Mind.—*Mrs. A. V. F. writes: "What is the best way to relax the body while lying down to rest? How relax the mind?"*

REPLY.—1. Just relax.

2. A more difficult question to answer. Some employ monotonous formulae which fatigue the mind to rest. Much the better plan is to lie down in an indifferent frame of mind, resolved to sleep, if possible, but not to worry, if sleep will not come. When one accepts what comes resignedly, calmly, and cheerfully, sleep comes. To try to relax generally defeats the end sought.

But Little Danger.—*R. P. F. writes: "I am a subject to rapid heart beats. Have I valvular heart disease, and are long walks injurious? Is there any danger of sudden death?"*

REPLY.—You are evidently in a "funk," probably worrying about nothing. Have a physician examine your heart; find out if you have heart disease and advise you what to do. As to danger of sudden death, there is but little danger whether or not you have heart disease.

Stop Worrying.—*J. A. H. writes that he has been nervous for three years. He says: "I worry and am greatly troubled with insomnia. I am an office worker and do not get much exercise, and I know that that has something to do with my nervousness. I should like to drink a large quantity of milk, but it gripes me. Will a bath in the morning help nervousness? Is bathing in the morning or at night best? Hot or cold water? What is the best way to avoid worry? What is the best way to regain lost weight? Will malt tonics, such as are sold in drug stores, help? Should I drink milk?"*

REPLY.—All your troubles come from your worry—your insomnia, your indigestion, your loss of weight. You must stop worrying. That is the important thing; the other things are secondary. This is a mental process which you must work out for yourself.

Worry is illogical. Nothing is more cause for worry than worry. Begin by cutting out all worry and all other forms of concentration after supper. The harm of worry comes from our concentration. Lackadaisical worry causes no more insomnia than lackadaisical inventing, merchandising, clerking, or keeping house.

A recent correspondent told of his method. It was to let his mind travel over the neighborhood where he spent his childhood. We recommend the adoption of some similar plan. The thing thought about must catch enough hold on the mind to drag it away from the worry

theme, and at the same time it must not be itself a worry theme. As you gain mental calm, contentment, and poise you will gain in weight.

In the meantime nothing helps as much as milk and cream. Drink three to four pints a day. If you will heat it well you will not get "gripes" from it. Milk itself does not cause gripes. Bacteria in milk may. So cook your milk. Malt tonics sold in drug stores will help.

Finally, get some exercise. Walk to and from work. If this is not feasible, walk up and down the stairs to your office. If you will walk up ten flights to your office each day it will help.

Don't Worry About It.—*A. K. writes: "I talk to myself in a whisper unconsciously. I do so more frequently while riding on a street car than anywhere else. I think this is done often without any muscular movement. Sometimes I am on guard against it, and I feel certain I am not talking, yet the action of the other passengers seems to indicate that I am. This is dreadfully annoying. What causes this, and what is the remedy? I am 70 years old. I have arteriosclerosis, but otherwise my health is fair for my age."*

Reply.—Why worry about it? Even if you continue it will not disturb the passengers and should not worry you. Keep your bowels open and your digestion good, eat moderately and be in the open air as much as possible. Do not worry or fret about your arteriosclerosis or your little lapses. In this way you will decrease your annoyance and you will find it will prevent you from annoying others.

Quit Worrying.—*M. K. writes: "I am 46 years old and am told by some of the best doctors that I have slow Bright's and intestinal indigestion. My hands and feet are always cold except when I am in bed. I have pain in the back between shoulders all the time, and sometimes up in back of the head. I am terribly nervous; everything worries me. What would you recommend?"*

Reply.—Quit worrying. Keep your skin going by wearing warm clothes, especially warm socks and gloves. Did you read that Amundsen put his thought on how to wrap his feet for warmth? Keep your bowels open, eat lightly and sensibly. When you have regulated your life sensibly you have done all that you can; therefore, quit worrying.

CHAPTER XXIII

Neurasthenia

THE PHYSICIAN AND NEURASTHENICS

Taking it all in all, people employ and reward physicians on the basis of symptoms and emotions. They, therefore, think more of that physician who relieves them or gives them positive optimistic suggestion than of the one who discovers causes.

The sick man wants to lean—just plain lean—and he does not want to go back up the stream to the fountain of things. If he is wise, and he usually is, he wants somebody to work out causes for him, but meanwhile he is tired and he wants to lean. It follows that the physicians who, along with their ministrations, brighten and cheer as they go, are those who have succeeded best in gaining clients.

But aside from this the pill that has been given to a patient who had faith, who took his medicine believing it would do him good, has always had its natural efficiency increased. Who of us has not seen people who scoffed at hypnotism, rejected suggestion, but who unconsciously paid tribute to it when it came as a potion taken in faith? For there are certain types of minds which are incapable of accepting a purely mental presentation, but who readily yield when this is supplemented by some physical act, such as taking medicine, laying on of hands or crystal gazing.

Even the strongest man needs spiritual help in his strongest moods. He needs it more when he is sick.

What then shall we say of the neurasthenic, the neurotic, the hysteric? They must have mental help and the physician must give it—admitted that the aches and pains are out of proportion to their organic or even their functional basis; admitted that the fifteen-story structure—the patient's complaint—is one story fact and fourteen stories mental perversion.

Let the medical counselor explore well the organic basis of the disorder and give to it every weight and care which it deserves—admitted that the physician sees clearly just how much of the disorder is real and that the patient exaggerates all out of proportion. But, is it not worth his while, from the purely medical standpoint, that the patient's concept is distorted? Should he not see in the wrong working of the patient's mind a demand for study, care, and help? If he observes clearly that the patient sees cloudily, is that a reason why he should dismiss the matter with a careless word? Rather does it not oblige him the more carefully to clear the cloud?

SYMPTOMS OF NEURASTHENIA

Neurasthenia is sometimes known as the American disease. It was first described by an American, Beard, and for a long time foreigners pretended that we had it copyrighted. It is cosmopolitan. *Wherever men wear out their brain cells with work or worry or fear, there neurasthenia is present.*

The word means nerve exhaustion. When the dictionary starts in to define neurasthenia it refers to nerve exhaustion, and then, recognizing that that means nothing tangible, it proceeds to add a lot of symptoms, each of which may or may not be present. For instance, the Encyclopedia Britannica names eight groups of unnatural sensations and then five or six kinds of fear. Stedman, after saying it is nervous exhaustion, names eleven groups of symptoms. They could just as well have named eighty.

The symptoms are the speakings of the exhausted nerve cells and they are liable to tell any sort of a story. The eleven given in one definition and the twenty given in another are just the eleven or the twenty stories most frequently heard.

These most frequent ones are headaches, pain in the back, toothache-like pain in the end of the spine, exhaustion after a little work, easy fatigue, poor memory, mental confusion, insomnia, worry, fear, and susceptibility to drug habits.

Some neurasthenics have one group and some another. I think the most important group are the drug crowd—the men who must get drunk when things do not go just right, those who have a little pain and must take morphin for it, repeating it until they are slaves; those who have a headache if they do not get their coffee or their soda fountain stimulant.

It has never seemed to me that anybody could read a dictionary definition and decide whether or not he was a neurasthenic. On the other hand, almost anyone who will read fifty or a hundred pages in some book on nerves can get a line on himself.

It has seemed to me much more important that a man should be able to decide whether he is of a mental makeup that develops neurasthenia under a little stress. Such an inquiry is the more profitable of the two.

If a man's brain is not under control, the foundation is there for neurasthenia. If he has not trained his mind to do its work without fear or worry or fretting, using therefor just the units of energy to do the job, the foundation is there. If he cannot rest, or relax, or play, or laugh, or sympathize, the foundation is there.

If he is erratic mentally, flies off the handle in anger or in prejudice, gets worked up or hysterical, he is of the neurasthenic type.

If he is fearful or worried, or gets headache after a little exertion, or is always undecided, he has got fairly well out of the group of neurasthenia potentials and into potential neurasthenics.

The less one is in the easier he can work himself out; but, whether in deep or shallow, the only way to get out is to work out.

TREATMENT OF NEURASTHENIA

"A Constant Reader:
the replyes that poor Nervous Sufferers get from your Health Corner is Simply heart rendering I dout the one that publishes them have ever had any Nervous trouble if they had they Never would publish Such Cruel things. I never would wish a dog Such Suffering, but I hope you people will have your shair some day. Speaking about a Neurasthenic Exaggerating thair suffering they never could make thair suffering known. I sourely know what I am talking about, how easey it is to advise a poor sufferer about something that you never have had any experience your Self. I don't cair how well learned you are, you don't know what anuther suffers unless you have suffered like wise."

The above letter is published for several reasons. An idea prevails that neurasthenia is a disease of the rich and idle. The composition and spelling, reproduced as written, suggest that the writer has not had much opportunity for education, and therefore probably is not rich.

The object of printing the letter with its errors is not in any way to expose the writer's limitations. It emphasizes the fact that neurasthenia is not a disease of the rich and idle. Being a result of nerve fag, it would be expected that those whose lives are hard would furnish many of its subjects, and they do. A great deal of neurasthenia is found among the poor.

The second reason for publishing the letter is that it is a typical neurasthenic output; a disposition to be unfair to others, a tendency to criticize and ofttimes abuse others is a part of the infirmity.

The third reason is that it sets forth the tendency of the person to exaggerate his sufferings, an inability to judge accurately of just how his suffering compares with the sufferings of others.

The fourth reason is that it is proof of the fruitlessness of trying to generalize with neurasthenics.

In order to understand these points better, let us see what neurasthenia is. In neurasthenia there is nerve tire. It may be that, through inheritance or poor food or a poor physique, the nerve cells are so constituted as to be easily tired.

Some people are so constituted that exertion which leaves others fresh will fatigue them to the point of exhaustion. In others the volume of work is so great or the character of the work is so wearing that exhaustion comes regardless of a good inheritance or a good physique or a good poise.

In still others the work kills, not because it is especially hard or fatiguing but because the individual has an untrained or an imperfectly trained mind. This lack of mental levelness, of control, causes the brain to exhaust itself in doing tasks which a better trained brain could do without fatigue.

Of these groups I think the lack of brain training group is the largest and most important. Next in importance I place the bad inheritance group. Last of all is the straight work group.

The individual who is neurasthenic has a physical basis for every ill he

has. His difficulty is in perspective. He cannot form good judgment as to the importance of his sufferings or the violence of his pains as compared with other people's sufferings and pains. He knows that he suffers like a dog, and he does. But what he cannot appreciate or understand is that somebody else is suffering like two dogs.

Back of it all lie the exhausted nerve cells. The nerve cells interpret things. If the digestion is wrong, the nerve cells tell us about it. If the gall bladder is wrong, the story is told by the nerve cells. If the day is hot, the nerve cells speak for us.

When the speaking is done by good, sound cells the story they tell compares about right with the stories told by the nerve cells of other people. When the speaking is done by exhausted nerve cells, the story is modified by the cells which tell it, and in consequence it cannot be taken literally, as can the story told by the better rested, better fed, and better equipped cells.

To ignore the physical disorder of the neurasthenic is not wise. To take the position that his recital of his sufferings is a gross exaggeration and that all forms of deception must be frowned upon is not wise. To dismiss the neurasthenic with a generalization, be it in the form of advice or of medicine in a bottle, is unwise.

The individual must be carefully studied, a diagnosis made, and then a prolonged treatment undertaken. The first object of the study is to find out what physical disorder is present—a much more difficult proposition than where the statement of the symptoms indicate accurately the condition of the organs.

Ofttimes the nervous exhaustion is the result of serious disease. In such a case, to make a diagnosis of neurasthenia and to conclude that there is no organic disease may be to overlook some such condition as a chronic infection of the gall bladder which has produced nervous exhaustion as the result of years of slight suffering; or the disease may be cancer or something else.

Assuming that the careful examination has ruled out important diseases, there still are the minor disorders present serving to nag and tire and also furnishing the nub of the symptom which the exhausted nerve cells are presently to touch up, change, exaggerate, and hand out as the symptom.

The next inquiry should be to determine the type to which this nerve exhaustion belongs. Is inheritance at fault, or bad physique, or bad mental habits, or overwork? As the result of these inquiries, diagnosis is to be made. And now on this diagnosis the treatment is to be outlined.

The dominating feature of the group is the exhausted nerves. To remedy this condition patient, plodding effort is required.

The most important of all the groups are those who are neurasthenic because of untrained brains. In this group belong most of the poor-sleeping neurasthenics, the worriers, the fretters, those who cannot pull because the harness frets them.

I remember driving a pair of horses seven miles in the country a few years ago. One, quiet, steady, calm, pulled most of the load and kept cool. The other, nervous and fretful, pulled almost not at all; nevertheless he was lathered with sweat,

It is easy for a person criticizing a neurasthenic to prove that he pulls but little, that he gets nothing accomplished. On the other hand, it is easy for the neurasthenic to show that he is always lathered with sweat and to argue therefrom that he is working.

More units of nerve force are used up in an hour of work, more nerve exhaustion results from ill devised, neurasthenic, fruitless labor than from exertion rendering the full amount of returns.

Therefore, the critic says, "You accomplish nothing." The neurasthenic replies, "I work harder than anybody and I suffer worse than a dog."

Of course, there is no contradiction in their statements. If these two people, critic and neurasthenic, are to get on together they must learn to see the other's point of view.

It is desirable that neurasthenics should get on with each other and the world at large. The inefficiency produced by neurasthenia will be greatly lessened by a greater capacity to make a superficial diagnosis of neurasthenia and to treat the individual thereafter as a neurasthenic, blaming him less than we do.

Some of the revolutions, many of the queer freaks of men, many of the opinions for which men are rejected, maligned, abused, defeated, banished, imprisoned, or beheaded are the result of neurasthenia.

It is important to be able to pick out neurasthenic men and neurasthenic opinions. It is also important to improve the condition of the neurasthenic. Some of them can be cured so as to gain much in efficiency.

To help a neurasthenic several procedures are necessary. The first is to be certain of the diagnosis. The next is to recognize such physical disorders as are present and give to them just their proper values.

The next step is to prove to the neurasthenic that you are able to see his point of view, to understand that tire is in proportion to work done, and not in proportion to results accomplished.

To do this just right requires intelligence. To convince the neurasthenic that you understand him and at the same time to save him from inferring that you agree with his opinion of the gravity of his disease is not an easy task.

The next step is to make the neurasthenic see himself as a neurasthenic. To do this he must be able to stand himself up by the side of others and then walk off a few feet and compare. Not an easy task!

Once a neurasthenic begins to analyze his own acts and his own opinions to find the neurasthenia in them a good part of the cure has been effected. So long as he keeps that up he will be a much more efficient neurasthenic, a neurasthenic much easier to live with. Next to being a cured neurasthenic it is desirable to be a neurasthenic who has found himself.

The next step comes in daily exercise in control of the brain. This is the most difficult of all the steps. It is time consuming; it is the step which leads to cure.

Some brains are strong enough to work out a cure alone. A neurasthenic may be strong brained, his disorder having arisen because his strong brain was untrained and uncontrolled.

Some brains are strong enough to work out a cure with a little help.

Some can get this help from daily study of some such works as those by Du Bois, Freud, Sadler, or even Vittoz.

Vittoz, while not on a plane with Du Bois or Freud, has the advantage of setting the subject a daily stunt. Such a stunt is a necessity, whether it be Bennett's, Vittoz's, or some devised for the particular case.

Some must have personal contact and teaching by a physician, psychologist, or a teacher of classes of neurasthenics. Some must lean upon faith in the supernatural while they are training their brains.

Some diagnostic skill is required to tell to which group each neurasthenic belongs. Another point in which the diagnostic skill is called for is the decision as to whether the neurasthenic is to be given rest or work.

If the nerve exhaustion has resulted from work and worry has been but a small factor in it, if the subject has gone about his task level headed, well poised, sleeping well, and has broken down because the load was too great, beyond question rest is indicated. Prolonged rest, free from every sort of work, including the strains of daily friction, is to be followed out.

It is in the nerve exhaustion where the work has been largely worry and insomnia that nice diagnosis is required. This group, given more release from work, will fill their minds with worry. There is no rule for them. The advice must be changed for the individual from time to time.

The fact is that the question is of secondary importance. The main thing is the mental training, the brain control. This having been acquired, rest will result from eliminating worry and fear.

The questions of feeding and giving of medicine belong somewhere in the same class as rest. The worry-fear group of neurasthenics will be steadied by a bromid-arsenic mixture as they will be by a period of rest.

If they use their drug-caused steadiness as a piece of firm ground on which to stand while starting mental training they will be permanent gainers. If they use it as an end in itself, they will gain but little.

There remain the two groups—the inheritance neurasthenics and the neurasthenics whose brains are part of poor body machines, the groups whose brain cells are exhausted from small loads of work or worry.

They are in this position: They did not enter the game of wear upon the same terms. It will be necessary for them to do all the things the others must do and a few things besides.

The man with poor physique must exercise systematically and persistently to develop a better machine. In exercising his muscles and in doing tasks requiring large numbers of muscles to work together he will be training all parts of his machine.

The neurasthenic with an inheritance basis must work still harder. He can find himself, one kind of a cure, or cure himself, a better kind of a cure; but he will have to work harder for it than the man with a good inheritance.

Neurasthenia cannot be cured by coldness or by sympathy. To begin with, its cure requires keen analysis of the individual case. Then follows patient, persistent, plodding training of the untrained brain. There is no royal road.

Neurasthenia.—*S. D. A. writes: "1. For about a year I have felt despondent, undecided, changeable, discontented, self-conscious, sensitive, and irritable. I crave friendship and feel depressed when left alone. My health seems to be good otherwise. I am constantly trying to analyze and cure myself as best I know how, but feel discouraged. However, I am not hopeless and am willing to try anything that will restore me to my former cheerfulness. 2. What is a psychotherapist? 3. Where could I find one? 4. Can you name any books on nerves that would help me?"*

REPLY.—1. You are neurasthenic. 2. A psychotherapist is one who studies the mental processes and prescribes not medicine but mental exercises. 3. Every community has many such. 4. "Physiology of Faith and Fear," by Sadler; "Conquest of Nerves," by Courtney; "Psychic Treatment of Nervous Diseases," by Du Bois.

First, find out if you have any physical ills. If none is found that is in proportion to your symptoms, put yourself in proper hands for a course in mental training. Expect, in the main, to work out your own salvation. Your psychotherapist can guide, direct, and control you, but it is your mind that is to be trained and it cannot be accomplished save as you work at it, patiently, optimistically, altruistically, sanely, and persistently.

Medicine in Neurasthenia.—*Reader writes: "I have been troubled with nervousness for almost a year and a half; I believe the doctor calls it neurasthenia. I have been examined by several physicians, and all say my blood pressure is all right and that I have no physical ailment. It is worry and fears that make me so miserable; the fears are things that seem ridiculous, yet, no matter how hard I try, it seems almost impossible for me to overcome them. The medicine I have taken seems to do me no good. Can you suggest anything?"*

REPLY.—You do not need medicine and you are right that it does you no good. Neurasthenia is, in part, inherited. In part, it results from bad training. The inheritance part you can't help. The training part you can help, although it will require more patience and persistence than if you had started right. First, get "Physiology of Faith and Fear" and study it carefully and persistently. Second, put yourself in the hands of a nerve specialist who will give some time to unraveling your mental state and finding you out. Third, go to work on your own mentality, for your mental regeneration will, in great part, result from your efforts at self-control and training.

Marriage and Neurasthenia.—*H. W. T. writes: "I send you herewith a newspaper clipping regarding a proposed change in the English marriage law. It seems to me the conditions referred to have been present with me for more than twenty years and have become more pronounced within the last few years. I find it difficult to center my attention upon any one thing. I have no initiative. There is a strange indecision as to the most trivial of my affairs. Everything is postponed to the last minute of the last day. My memory is poor and mental lapses are frequent. Periods of depression come with fears of the future or with regrets over the past. My anger is sometimes aroused on the slightest provocation and there is a proneness to weep. Please tell me what is the best thing for me to do."*

REPLY.—I have read the clipping referring to the proposed English law making marriage with a mental defective a misdemeanor. It is one of

those negative eugenic measures that various countries are wrestling with. Such laws, though probably different from their present forms, will eventually prevail everywhere. Of course, correspondence diagnoses are guesses, but there is an axiom that no man is insane who thinks he is. On the other hand, your letter describes a typical neurasthenia. You are in no danger of going crazy. You do need medical help. Put yourself in the hands of a psychotherapist. Read some of the popular books on nerves. Go to work on your mental methods and keep at it.

Neurasthenic.—*W. F. writes: "Can you suggest mode of living and treatment for great nervousness, irritability, physical and mental exhaustion, aches and pain in eyes, head, and all over body, which are permanent and increase in dull and heavy weather? The condition has repeatedly been diagnosed as neurasthenia. Is chlorid of iron beneficial, and for how long a period can that be taken?"*

Reply.—If you are in need of iron, chlorid of iron is a good form to take. You can take it for a year without detriment. Exercise in the open air, training of your muscles, plenty of sleep in fresh air, properly adjusted eating, and regular bowel habits are all helpful in neurasthenia. But, assuming that you have been correctly diagnosed and are a neurasthenic, you must not forget the fact that neurasthenia is a quality of mind. The essential is that you train your untrained or wrongly trained mind. It is necessary that you forget your ills. You are self-centered. You worry. You are afraid.

First, you must learn sociability. You must learn to play, and with others. You must learn courage. You have an idea that the bogey man will get you if you don't watch out. That you must overcome. You worry. That you must stop. You cannot decide. You wabble between opinions, between hopes and fears. That wears you to a frazzle in the day and dreams you into waking at night.

Have I said enough to show you where your salvation lies?

Mild Neurasthenia.—*M. J. K. writes: "I find trouble often in concentrating my mind on any one subject. I often have to read such matter as newspaper writeups three and four times before I know what I'm reading. In other words, I read the words mechanically, while I am thinking of something else. And in my work I find myself dreaming at times. Is there anything I can do to train my mind to stay where it is put until I get ready to use it for something else?"*

Reply.—This is a mild neurasthenia. Maybe all that you need will be to read and apply Freud or Du Bois, or perhaps even Vittoz.

In the last named are some things which are misleading. Freud is the more critical in his analysis of mental states. Du Bois holds the mirror up so that a neurasthenic sees himself in a saner light.

The crux of the neurasthenia situation is, first to find oneself and then patiently, ploddingly, and sanely to make good.

Try Reading These Books.—*H. P. P. writes: "I frequently have sensations of fear that any breath may be my last, or something sensational. My heart is in excellent condition. Please give me your opinion."*

Reply.—You probably have a simple neurasthenia and are in no danger. Go to the library and read "Physiology of Faith and Fear" by Sadler, or "Mind and Work" by Gulick, or "Making Life Worth While" by Fisher.

You must be trained or train yourself so that you can control foolish fears.

Better Read Du Bois.—*B. L. B. writes: "For a couple of years I have been addicted to worry, mental indecision, melancholia, and have often wondered if I was not on the verge of insanity, so extreme has been the trouble. I doctored for a time, but without permanent benefit, and now am inclined to think that there is no medicine that will avail in such a case. The only antidote for this anxiety, etc., that I have found is a sense of intelligence that comes and goes, but whose coming temporarily allays mental stress. What is this mental relief agent, and how may one learn to meet every worry with intelligent thought instead of being driven by constantly arising perplexities into a state of worry that so reduces one's living efficiency? I have found that to associate with healthy minded, unselfish people and a habit of reading anything of general interest are of great benefit. True humor is a veritable godsend. Work is often a great help, but sometimes an added worry. I doubt not that I am but one of thousands who are similarly troubled, at least to some extent."*

Reply.—B. L. B. paints a good picture of neurasthenia. Neurasthenics seldom become insane, though they usually think they are on the verge of it. This disposition to magnify their troubles, to think that their peculiarities differ from those of thousands of others, constitutes one of the manifestations of their self-centered condition.

B. L. B. has a vein of humor and a sub-stratum of good sense that make it plain that he is on good ground. Were he to read Du Bois, he would laugh at himself for a week.

Probably he requires nothing except to read this book.

Cures Self of Neurasthenia.—*C. M. M. writes: "The article which appeared March 6 on neurasthenia was especially interesting to me, as I have been troubled with the same disease or ailment, but have been restored back to health. I had a severe attack of nervous trouble about eighteen months ago. My pulse would beat rapidly and then irregularly. Then at times I would have spells of fear, and think I was dying. The palm of my hands would be wet with cold perspiration. I had shortness of breath sometimes. The blood in my limbs would feel hot and clogged. My mind would be almost a blank at times. I slept but little, but when I did I would awaken with a sensation of fear. I would lie for hours with my hand on my pulse, thinking every beat was the last. I would get weak at times. This trouble would generally come after eating. I had some of the best physicians. Medicine did me more harm than good. I finally took my own case. I got out in the open air. I associated with people of strong personality. I kept my mind off what I termed a fatal disease, and threw off that fear. I got hold of new life, and said to myself, 'I'll live it down.' I succeeded. That was my medicine."*

Reply.—This is published for the help of neurasthenics. However, you got off easily. With most people working oneself out of even a mild neurasthenia, as was yours, is more difficult and tedious.

Should Learn Control.—*C. writes: "About two years ago I was struck at the base of the brain on the left side of my head in an accident and practically recovered in about three weeks. I find that I am now suffering from fear to such an extent that I am miserable. I am employed as secre-*

tary and carry heavy responsibilities. Is it the natural spring decline or is it due to my nerves? I feel like screaming when at the theater and lay wide awake at night, while my body seems exhausted, and finally doze off in the morning. Would you advise my taking treatment physically or mentally? I am worried over this affair, as I had wonderful nerve control and a happy-go-lucky spirit previously. I sleep restlessly and dream of ugly things. While busy I am all right, but when I get home at night, tired and hungry and long for rest, I become unhappy, and this state has made me worse every evening until now I don't enjoy anything. I tried to fill my evenings with entertainment and plesaure, but have a desire to scream and picture horrible calamities and vivid suffering. Am I just overworked? What mental food do I need? I am 25 years old. I have severe pains in my head (where I was struck) almost continually. I gave up all kinds of headache powders a long time ago."

REPLY.—So far as your use of headache powders is concerned you are wise. Headache powders give temporary relief. If their use is persisted in they come, in time, to cause headaches. You are neurasthenic, almost hysterical.

Neurasthenia usually has a physical basis. The characteristic of the disease is exaggeration of symptoms, not imaginary, but actually existent symptoms. Self-pity, nerves, desire to scream, restlessness, dreams, worry are the results of such exaggeration. It is not often as easy to prove the physical base as in your case. But, so far as the injury to your head is concerned, you can do nothing.

The plan is to build up your general health and to learn control. A course in a sanitarium where control is taught would benefit you. Psychotherapy given outside an institution would benefit you.

Case for Psychotherapy.—*M. H. writes: "Would you think the following symptoms serious: A skipping pulse, never counting fifty without three and sometimes more skips; each time the pulsation is felt in the throat; a palpitation in the stomach with the same sensation in the throat; a pulsation at times all through the body till the ears pop and the head seems full; great exhaustion at times; occasionally acute pain in the chest, this, however, not frequent. Some days these symptoms are trying. The subject is in good condition every other way. The age is 51."*

REPLY.—A lot of subjective symptoms. If a physician finds no organic basis for them, and he probably will not, the case is one for psychotherapy. Watching the pulse can make it skip one beat in sixteen.

Temper in the Morning.—*T. A. writes: "Why should I, a middle-aged man, be so ill tempered in the morning and be quite good natured after starting to work? Has the body been manufacturing poisons while I slept? Please suggest some simple remedy to overcome this condition."*

REPLY.—I should say you have sized the situation up right. Maybe you do not sleep enough; maybe you sleep too much. First, regulate your sleeping hours; second, improve the ventilation in your sleeping room; third, take a cold bath—water or air—and a good rub before breakfast. Do not take any medicine for the condition.

Victim of Neurasthenia.—*Mrs. W. N. E. writes: "I am five feet four inches tall and weigh 162 pounds. What should I weigh? The doctor says my heart is weak. The top of my head hurts and the back of my neck.*

It is worse at night and often keeps me awake. At times I feel so depressed everything looks dark. I am very nervous. At times I can't keep quiet. At other times I am completely exhausted and could lie down for hours and never move or wish for anything. When some of my most welcome and loved friends come in to call I get so cold I shake after they are gone. I feel warm soon. I have always been among people a great deal. What causes such troubles? I am 34 years of age."

REPLY.—You are twenty-five to thirty pounds overweight. You are neurasthenic. Your physician can show you how ill founded are your aches and fears. Read Sadler's "Physiology of Faith and Fear," published by A. C. McClurg & Co., or "Conquest of Nerves," by Courtney, published by Macmillan Company.

Neurotic and Nervous.—*R. M. C. writes: "Will you please give the definite meaning of neurotic, and how it differs from nervous? Is there value for a poorly nourished person in rubbing the flesh with olive oil or milk, either fresh or evaporated?"*

REPLY.—1. A neurotic is a person suffering from a nervous disorder. As the term is generally used, a neurotic is a person suffering from neurasthenia, or with a tendency toward melancholia, or exaggerating his ills, or disposed to be hysterical. A nervous person is one whose nerves are on edge, but where there is less disturbance than with a neurotic. A nervous person is one easily excited or agitated.

2. No; neither will be absorbed.

NEURASTHENIA AND HYSTERIA

As compared with general paresis, dementia precox and paranoia, neurasthenia, hysteria, and melancholia are minor maladies. They produce no deaths and no sickness that find their way into morbidity tables. Yet as producers of inefficiency they approach, though they do not equal, hookworm and malaria.

That so large a part of the people are neurasthenics and hysterics is the result of several causes. One of them is a faulty educational system. Payot in his "Education of the Will" says:

"It is from this point of view that we should readjust from its very foundation our method of undergraduate and higher instruction. It is very important to abolish the foolish principle of cultivating the memory exclusively, for this is weakening the vital forces of the nation.

"We shall have to plunge into the inextricable thickets of the curriculums of all the schools with a hatchet so that we may cut out the tangle on every side to let in the daylight and the air, and we must be willing sometimes even to sacrifice some beautiful plants which are too crowded and which will never grow.

"Instead of encouraging feats of memory, we must substitute active exercise and work which will develop the power of judgment and intellectual initiative and vigorous deductions."

The schools are for the purpose of training the mental machine. It is a part of their duty to prevent the development of the inefficient machines known as the neurasthenic and hysteric minds.

Another cause is bad inheritance. In Bridger's "Mind in Distress," the great cause of neurasthenia and hysteria is given as mental isolation. This suggests as an increasing cause the isolated life of the only child and this leads easily into the next heading.

Neurasthenia and hysteria are caused by a lack of training in the home. Bad heredity, poor home training, poor school training, lack of opportunity for play, absence of proper training in one's work—these causes operating result in a great mass of neurasthenics and hysterics.

Why they are here is not the subject of this article. This article is written in answer to the question: Can anything be done for those already among us? The answer is: Yes.

At that, there is no royal road. Those who are willing and able to work out their salvation can do so. Those who are looking for cure from a bottle of medicine or some other form of magic will not be cured.

The machinery of society for curing neurasthenics is of no consequence. If a neurasthenic has it in him to work out his cure he will attain it, but not otherwise. If a man has smallpox society will catch him and cure him; not so if he has neurasthenia.

Bridger defines neurasthenia as loss of balance in the masculine type of mind; hysteria as the loss of balance in the feminine type of mind. Note the statements are "masculine type," not male type; and "feminine type," not female type.

The masculine type is highly practical, demands proof before accepting conclusions, and relies only on facts. These are the plodding, steady people who achieve financial success or at least stability. Without having studied formal logic, they are logical and rely upon the relation of cause and effect, considering that to be the one and only criterion of sane judgment.

The feminine type is devoted to ideals. It sees the end to be attained, but is little concerned with process of attainment. The feminine type has the reasoning faculty, but it does not rely on it exclusively. It depends largely upon intuition and instinct.

The feminine type of mind occupies a much greater area of the brain than does the masculine and presumably that is the explanation of its wider range, its greater capacity, and its relative incomprehensibility. Being more complex, it is more unstable.

Bridger says of the feminine type that, given a good heredity and a wise education, it presents the highest type of mental development, range of vision, clearness of faith, conception and love of ideals, rapidity of perception, breadth of judgment, love of the beautiful, all under the control of a reasoning power not tied to material possessions, never accepting the narrow and practical as the only view.

He divides feminine mind types into three groups,

1. The pure feminine mind type, occasionally found in men, found in a high percentage of women.

2. The weak feminine mind type. Many men as well as many women are in this class.

3. The mixed type, in which many traits of the masculine type are intermingled with feminine traits.

Bridger attempts to reduce these types to mathematical mental formulae as follows:

NORMAL AVERAGE MASCULINE TYPE OF MIND

Conscious portion—	Total Amount.	Distribution Inhibited.	Ex-hibited.
A—Ideas relating to self	30	15	15
B—Ideas relating to others	15	10	5
C—Sensation (impressions)	15	5	10
Subconscious portion—			
D—Instincts	10	8	2
E—Impulses	10	8	2
Unconscious portion—			
G—Reflex muscular and secretory impulses	20	8	12
	100	54	46

NORMAL AVERAGE FEMININE TYPE OF MIND

Conscious portion—			
A—Ideas relating to self	20	10	10
B—Ideas relating to others	5	2	3
C—Sensation (impulses)	10	5	5
Subconscious portion—			
D—Instincts	30	25	5
E—Impulses	15	10	5
Unconscious portion—			
G—Reflex muscular and secretory impulses	20	8	12
	100	55	45

A frequent division of the mental impulse is into three groups. The reflex acts are usually designated as the lowest mind functions. Most authorities refer to instincts and intuitions as mental processes of the second order. Bergson, however, disagrees with this idea. Bridger says that it is not proper to say that the conscious ideas are either superior to or inferior to the instincts.

Environment furnishes stimulation to the mind. Some of this stimulation is distributed to be stored as inhibited impulses (memory), and some is distributed to more active mental acts. It is the will which determines the distribution.

Bridger thinks that whatever tends to produce isolation of mind is the one great antecedent condition to neurasthenia. As long as even the most unstable of minds keeps itself among the crowd and is in and of the world, it is on safe ground.

In proportion as one fails to keep in contact with humanity the tendency to isolate oneself grows, until the mind has become a hermit mind. Out of this grows neurasthenia or hysteria, according to whether one is of a masculine or feminine type. The men "grand, gloomy, and peculiar," are peculiar because they are grand and gloomy.

The neurasthenic, having lost his sense of proportion and having exaggerated his ego, exaggerates qualities relating to his ego.

Our general store of knowledge, a register of our conclusions to date, constitutes our common sense, and this is one arm of the mental balance. This common sense is kept in a state of general average with other minds by contact with current opinion. Lose this contact and the balance is disordered. Much depends on the soundness and stability of the common sense.

The other arm of the balance is made up of the new impressions coming from the internal organs and from the outside as well. A normal individual maintains a mental balance between these with ease.

When this balance is disturbed in the masculine mind, the reason tries to reëstablish it; the egotism trained in isolation and introspection leads wrongly. The person becomes a victim of self-suggestion. This is Bridger's idea of neurasthenia.

The influences predisposing to hysteria fall into two groups—the exalted ego or overcultivation of self, and the starved instinct, which includes all checks to the proper gratification of normal instincts. These act on the feminine type of mind.

When they act on the pure feminine mind type the result is the ordinary hysteria of the textbooks with the excessive emotional explosions so well understood.

When they act on the weak feminine mind type, the person is always ailing and sick, exaggerating and coloring her statements. unreliable and untruthful, excitable, weakly emotional, and selfish.

Hysterical persons can develop any symptom. They may have any form of mental disturbance or nervous symptom. They may develop fever or jaundice or slow, fast, or irregular pulse.

As a means of curing, the first essential is to give time enough to find out everything in heredity and environment, even to the smallest detail; then to encourage the mind to show how it works. Bridger closes his eyes and allows the patient to talk himself out. Barker lays stress upon allowing the patient to tell his whole story.

The next step should be a painstaking physical examination to exclude organic disease giving symptoms sometimes simulated by neurasthenia and hysteria.

This information being in hand, the next step is to analyze it and map out a plan of procedure. The best authorities are of the opinion that work is the thing.

Cabot says: "The sufferer must learn to stand upon his own feet. He must get back into life. 'Real life,' as we now begin to see, after all is the best teacher and the best doctor. Seclusion in sanitaria or rescue homes is being replaced by efforts to get the sufferers back into industrial life, back into family life, back to the surroundings which keep ordinary people going, back to the best that civilization has to offer to normal people."

Bridger says: "Work must be insisted on. A man's occupation, if it be at all congenial to him, and if it provide means of meeting and conversing with his fellow man, is the best. It should be of a kind that, once started, means compulsory regularity and attention. All other measures

will fail until you have secured this essential to success. In nine cases out of ten it is the only treatment necessary.

"Seek out the ambition latent in the patient—some ambition is latent or active in every man—and stimulate it. All who treat neurasthenics make use of some form of suggestion. The variety to be used is to be determined by the person and by the psychotherapist."

The method of treating hysteria given by Bridger is (1) understand and control the patient, (2) alter her surroundings to her benefit, (3) find systematic employment for the mind, (4) make a dramatic mental appeal and suggestion.

As a résumé, Bridger says the cure of hysteria depends in general on the personality of the doctor, on his knowledge, firmness, judicious sympathy, and above all on the confidence he inspires.

In neither hysteria nor neurasthenia does he advocate the use of drugs. In his opinion they keep the person self-centered; they further stimulate introspection; they appeal to his ego and the little good they do is better done by exercise in the open air, while they do harm by twanging the string that is most out of tune.

An essential part of the Bridger system of treating minor mental disorders, especially neurasthenia, is to discover the bogey and to get around it. By the bogey he means the phobia.

The bogey of a neurasthenic is that person's supreme dread. It may be insanity, suicide, injury to self-esteem, loss of good repute. When one has had some experience he can guess the patient's bogey long before he tells it, as he relates his story.

Bridger advises that bogey never be charged in the open. Sometimes he builds a rival bogey; sometimes he patiently and slowly tears it to pieces; sometimes he undermines it. As I understand it, he thinks it advisable to deceive the neurasthenic and thus in time show him how he has been deceiving himself.

To do this requires a very great skill. Neurasthenics and hysterics especially are exceedingly suspicious. They suspect everybody, and to outwit them is not easy.

On the other hand, Cabot is a strong believer in telling the truth. Barker advocates telling the truth discreetly and tactfully. "Reprehensible, most will agree, is the practice of permitting the patient to believe that his absurd fears are well grounded."

Most important of all, finally, is the tedious work of reëducation, the doing of work that should have been done in childhood; the doing of it under circumstances in which the person starts from much worse than an even break. The different steps in reëducation are as follows: training of the voluntary attention; following this comes the rational reëducation of the emotions and the will; then comes training of voluntary activity or conduct. To begin with, this may have to be done under outside direction. At the end it must be largely self-direction.

Treatment of Neurasthenia.—*R. R. R. writes: "How should neurasthenia be treated when it has been growing worse since childhood? What causes neurasthenia in children? A neurasthenic knows no mental disci-*

pline, so please do not suggest it. I would do almost anything to rid myself of that terrible fear which overshadows me, but I can't do it with my mind. If you do not care to answer my questions will you kindly suggest any books on the subject?"

Reply.—A supposed neurasthenic should be carefully examined to exclude organic disease. If it be found that there is no organic disease, then treatment for neurasthenia should be begun. The neurasthenic should not be ridiculed. Such a course is folly. Neither should he be sympathized with. That, too, is folly. The only treatment worth while is mental training.

You are right, a neurasthenic knows no mental discipline. But that fact is a reason for mentioning mental discipline, not for ignoring. The neurasthenic who can train his mind can be cured; the others cannot. The process is necessarily a slow one, but no one can say in advance that it cannot be done. Some neurasthenics read such a book as Du Bois or Sadler, recognize themselves in the cases stated, and get control of themselves without outside help. Some follow the exercises in Walton's "Calm Yourself" or Bennett's "Human Machine" or Sadler's "Worry and Nervousness," and cure themselves. Some require the services of neurasthenic specialists. Some gain control by constant study of Mrs. Eddy's "Science and Health." Some prove incapable of mental discipline. Neurasthenia in children may be the result of inheritance or lack of training, or both.

INSOMNIA

Insomnia is sleeplessness. It does not occur in youth or in those who work with their muscle, especially if they work and live in the open air. It does not occur much before middle life and then more frequently in men than in women.

Excluding actual disease, pain or delirium it is substantially always accompanied by overeating or injudicious eating in those of sedentary indoor lives. Granted that worry is the cause it is wise, in offering relief, to consider well the digestive apparatus of the sufferer.

As health editor I receive letters about insomnia every day. Certainly many people are not sleeping well. To these letters I sometimes reply telling of this or that thing which can be done. Then there follows a series of letters from people recommending procedures. Therefore let us make our views plain and emphatic.

Insomnia is a condition of mind. When the brain works too hard, the man wakes. He cannot go to sleep again until he has got his trolley off the wire. The thinking may be cool, judgmatical weighing of probabilities; it may be imagination producing poems, ideas, or inventions. (The best thinking can be done in the night hours.) Or it may be worry with its 5 per cent. of efficiency and 95 per cent. of waste, worse than railroad waste or most any other kind, for the most foolish thinking can be done during night hours.

The point is, it is thinking that does it. Whether the thinking is good or bad is a detail.

There is no remedy except mental training. A man must either

train himself to loosen his mental tension before and while he sleeps or pay the consequences.

How he is to train himself is another matter. But it must be done. Physical work, hot baths, and things of that character are better than sulphonal and bromids. Nevertheless, they are in the same category. They do not take care of the root of the difficulty, which is wrong mental methods—taking your work or your worry to bed with you.

A man who has done hard, muscular labor and who worries will have his brain paralyzed by the chemicals of muscular fatigue for, say, six hours, but following that brain concentration gets the upper hand, and he wakes up.

In insomnia there is no permanent short cut. You must make your brain join the union and keep the working hours of the brain workers' union, otherwise you will go on the scrap heap before your time. And finally your death certificate may read any one of a dozen ways.

Insomnia.—*L. W. C. writes: "I have for several years been a great sufferer from insomnia, not getting on the average three hours' sleep out of twenty-four. For six months I have not averaged more than that, and alternate eevry night with bromidia, somnos, and veronal, so that no one wears out entirely. But I fear I am endangering myself by this constant use of these medicines. I am so heavy every morning it is hard to get up. What evil effects can come of constant uses of these medicines? I am a traveling man and constantly on the go."*

E. W. S. writes: "I felt that you had found the root of the matter when you referred to the primal cause of sleeplessness as being a matter of mental control. If you can go just one step further and tell the great army of insomniacs just how they can barricade their minds against the 'imps of thought' that come thronging in the hours that should be given to slumber you will be demonstrating a priceless boon to sufferers from wakefulness that 'terror by night.'"

J. S. T. writes: "To divert the mind from worrying subjects read one or more chapters of history before retiring and select a number of topics to be remembered, say ten or twenty, or as many as you please. When wakeful recall these topics, counting each topic recalled by holding up a finger till the full number is recalled. You generally go to sleep in the effort."

C. S. S. writes: "I see much written about insomnia. I would be glad to relate my experience to those that are troubled that way. I come to look upon my experience as a great blessing. I learned to repeat the fourteenth and fifteenth chapters of St. John. Then, when awake, I would repeat and study these words, words teaching us how to live and how to be saved through all eternity."

Reply.—So many people write me about insomnia that I am sure it is a matter of great public interest. I have written about it more than once, but I think it advisable to publish the above series of letters and to comment on them.

To L. W. C. we wish to say that no circumstances justify the nightly use of bromidia, somnos, and veronal alternating or after any other plan. He must take such steps as are necessary to remedy his condition. Palliation will get him in trouble.

E. W. S. recognizes that thought cannot be stopped by willing it. If the mind is occupied by thoughts which keep one tense, the remedy is

to start a train of thought which is attractive enough to replace the harming line and not stimulating enough to develop tenseness.

To some people J. S. T.'s suggestion is a good one, to others the suggestion of C. S. S. will be more helpful. Some line of diverting thought must be indulged in.

Let us keep this clearly in mind—insomnia is a state of mind. The remedy for it is mental. Physical conditions contribute somewhat. Physical treatments of different kinds help somewhat. Drugs for it are not to be thought of. If the condition is bad enough to need drugs, or is thought bad enough to need them, it needs remedial treatment worse.

Cause of Sleeplessness.—*S. J. C. writes: "I wish to know what is the cause of my restlessness when retiring for the night. It takes hours before I fall asleep. I am in perfect health, have nothing to worry about or anything to cause me to keep awake. Kindly tell me what causes it and advise me as to the cure for it."*

Reply.—You do not go to bed with a mind at rest. Spend at least two hours before retiring in getting rid of all mental tension, and then go to bed and sleep. Don't try to sleep or think about not sleeping. Just take sleep as it comes, and come it will.

Sleep Mental Condition.—*M. B. writes: "I am an office man of 65 years and weigh 145 pounds. My health is pretty good, but I am nervous and my sleep is not good. I go early to bed. I don't drink nor smoke in the evening, and my sleep is disturbed by dreams all night. In the morning I feel weak. What could you suggest to obtain a more healthy sleep?"*

Reply.—Sleep is a condition of mind. It is similar to worry, anxiety, concentration, equanimity, in that it is a mental state. Therefore the treatment for it is mental. Briefly, certain principles are:

1. Do not try to sleep. Simply turn loose and sleep.

2. Drop the concentrations of the day a few hours before bedtime. Some can accomplish this by physical or mental play after supper. Some can only force their minds to turn loose by reading something with grip in it for them—novels for some, philosophy for others.

3. Physical aids, such as baths, proper eating, and proper bedroom arrangements, are of service.

Needs More Sleep.—*Anxious Mother writes: "I am not a strong woman and not sickly, but I am nervous. If I get eight hours' sleep I feel well for the day, but I seldom get it, as I wake up and cannot go to sleep again. Is there anything I can do for this, so I can sleep more? I have a daughter two years old who is nervous. If the mother is nervous does it affect the child, or does she outgrow it?"*

Reply.—1. You are right; you need more sleep. Eight hours is not enough for a nervous woman; less than eight hours is certainly not enough. When you awake, do not get nervous about being awake or over your thoughts. Convince yourself that you do not care to sleep. Do not let your desire to sleep make you tense—turn loose and sleep or stay awake, as it comes. As soon as you get in this frame of mind you will sleep. Perhaps intestinal indigestion awakens you a certain number of hours after your evening meal. If so, eat a light, simple supper.

2. Children do not grow out of nervousness, but they may be trained out of it. A nervous mother is liable to have a nervous child for two

reasons—inheritance and association. Train your child to be quiet and calm.

Cause of Dreams.—*H. G. B. writes: "Can you tell me what causes a person to dream after retiring at night?"*

REPLY.—Lock the doors to your brain when going to bed. The nerves are the doors through which impressions reach the brain and disturb sleep. These disturbing impressions may come from outside, such as noises, cold, and uncomfortable bed. They may come from within in the nature of pains of various kinds, disturbing thoughts, worry, or mental excitement.

If the sleep disturbing impressions are strong enough to unlock the doors to your brain against your will, they may be due to some underlying organic disease.

Often the stomach gets in between the door and will not allow it to lock. In such instances it is well to let the stomach go to bed empty, in order that the brain may not be rocked and disturbed by dream thoughts.

Wants More Sleep.—*R. M. writes: "I work at night and go to bed about 9* A. M. *dead tired. But every day I wake up about 2 to 2:30* P. M., *and, although I lie in bed sometimes until 6 or 7 it is impossible to go back to sleep. I wake up without any cause. Can you suggest any way of getting over this?"*

REPLY.—By that hour your fatigue poisons are pretty well used up. In consequence, slight influences are sufficient to awaken you. A gripping dream will do it, or a noise, or a full bladder, et cetera.

Make things right as best you can; then lie quietly in bed, free from worry and fret, until 5. If you do not sleep you will rest, and that will do you nearly as much good. If you sleep, so much the better. When you have developed the above frame of mind you will sleep that extra time.

Insomnia not Disease.—*W. B. writes: "In your recent article on insomnia you lay the cause for same to a mental condition. Is it not a fact that some cases are due to physical causes, for instance, an overloaded stomach? I am given to nervousness and worry, I admit, but I find that after eating heavily in the evening, I invariably awake about 3* A. M. *and find it hard to fall asleep again. Would not a person of good, healthy nerves become a victim of insomnia in time through this cause alone? In case both the physical and mental conditions have run down and both were good at birth, which would you lay the blame to for the state of both, ordinarily—that is, is it not usually the bad mental state that brings on the physical ailments?"*

REPLY.—A man going to bed with his mind tense would wake up from any one of a dozen things, ordinarily of minor consequence. A full stomach would be one of these; a little noise, the light turned on, the flapping of a curtain, are illustrations of other things, ordinarily of minor importance, which would serve to wake up a tense mind about ready to become conscious. Do not confuse the issue. Mental tension is the main thing. A bad mental state would affect the physical state. A bad physical state would affect the mental state. The latter is more of a factor than the former, but the relations between these two must be determined for each case. Do not forget that insomnia is a state of mind and not a disease.

Mental Training for Dreams.—*Mrs. J. K. P. writes: "What, in your opinion, causes dreams? I dream every night, sometimes having as many*

as five different dreams, waking up dull and unrested. Also, what causes talking in one's sleep, which consists usually of muttered phrases?"

Reply.—Dreams are the thoughts of a sleeping mind. There is no radical difference between dreams and ordinary thoughts. If you want to study the subject deeper, go to the library and ask to see Brill's work on Freudian analysis. You may be able to understand most of it and you may not. There is no way to stop dreams short of mental training. If you care for your digestion and sleep in a comfortable bed in a cool room you will help some, but the real cure is to go to bed always with a mind well poised, happy, contented, and free from hate, envy, worry, or fear. If you can train yourself to that as a constant frame of mind, your dreams will be sweet, peaceful, and restful.

Afflicted with Nightmare.—*J. E. M. of Cañon City, Colo., writes: "I am now over 65 years old. I have what is called nightmare and although I seem to know enough to make a noise so that my wife comes from another room, she often has difficulty in getting me out of them, as I cannot move hand or foot. When I do get awake my heart is fluttering as if I had exhausted myself by running. I have not found a doctor who can give me anything to prevent them. Can you advise a remedy?"*

Reply.—1. Train yourself to go to bed with your mind at rest. A man who suffers from nightmare also suffers from daymare. A man whose mind is agitated during his waking hours is certain to have more or less agitation during his sleeping hours.

2. See to it that your sleeping arrangements make for comfort.
3. Eat very simple evening meals—milk, bread, cheese.
4. Correct all constipation and intestinal indigestion.

Causes of Nightmare.—*P. R. A. writes: "What is the cause of nightmare?"*

Reply.—Mental tension is an important cause. Overeating, especially at night, is another. The remedy, when these are the causes, is light suppers and a mind at peace and resting.

CHAPTER XXIV

Insanity

TO PREVENT INSANITY

Dr. Bayard Holmes says one person out of each 400 is insane before he dies; that there are 150,000 insane in hospitals in the United States, and their maintenance costs the different governments $50,000,000 a year.

When a man stands one chance in four hundred of getting something he does not want, it is time for him to sit up and take notice.

A great deal is known about the causes of insanity and how it can be prevented, but those who have this information are off to themselves, and those liable to go insane do not know of the means of prevention. The men having the information are stuck off in corners running asylums to care for the insane. The people who will go crazy unless something can be changed are working in offices, factories, and on farms, caring for children or loafing in red light districts. The state, which spends millions to care for the insane, has much valuable information in the records of its asylums, in the knowledge of the asylum officers. Some of the people of the state are losing their minds because they do not get and do not apply the information which is not "working at its trade."

Because a man is born of an erratic, neurasthenic or hysteric stock is no reason why he should go insane. It is a reason why he should work harder to control himself. Because a woman is goiterous is an additional reason why she should work out a program of mental poise. Because a man has had syphilis, he should not drift helplessly into insanity. It should be the reason for shaping a career to avoid it. If a man who takes whisky, morphin, or cocain goes "batty," he should find in that a reason for cutting out dopes and not a reason for taking more. Many times keeping on one's mental keel is a matter of knowing how and then "living it"—two separate things.

How can it be made possible for everyone interested to "know how"?

ERYSIPELAS IN THE INSANE

A few years ago it was noticed that there were certain diseases which helped the minds of insane people. A woman who had been in a stuporous condition from melancholia for weeks would contract erysipelas. As the result of the toxins of that disease she would brighten up, take a rosier view of things, and occasionally would recover. No other disease exercised so favorable an influence as erysipelas, and no other mental state was so much helped as melancholia.

There is not much physical basis for melancholia. It is just a matter of tangled ideas. There are people with troubles enough to depress a wooden man, but they do not get melancholia. In fact, they are apt to get happy, or, at most, resignedly accept the inevitable. The melancholics are those who get that way without having any right to do so. They are below par in their mental point of view.

The toxin of erysipelas is a booster. It may boost clean over the fence, but it boosts just the same. Therefore it is like an antidote for melancholia.

Sometimes they are cured by something which gives them a mental jolt. When an asylum burns some of the inmates go batty, others develop some emergency ability, and some are cured by the experience.

Even typhoid fever in the insane leaves behind a trail of betterments. While an attack of typhoid is becoming more trivial all the time, it disturbs all the physical being profoundly. Twenty years ago cases went into a profound stupor called the typhoid state. Now a doctor who does not keep his patient clear eyed and quick witted through typhoid is a pretty poor human engineer. Nevertheless, after typhoid the hair falls out and other changes indicate that the process has been profound. Through profound changes occasionally a sick brain finds a way back to sanity.

Insanity.—*Sincerely writes: "Some five years ago before I was of age I was an inmate of an insane asylum for two months and probably was insane for six months. Under such a law as Indiana has would I have been unsexed? I am now a fair specimen of physical manhood, ordinarily intelligent, and of temperate habits. Do you consider me fit for marriage? Do you think there is any danger of my children not being normal?"*

Reply.—You probably are not greatly disturbed mentally. Properly regulating your habits of mind, your trouble should never return. Answering your question as to Indiana, no, emphatically. Answering your question as to marriage, you do not furnish me enough facts as a basis for an opinion. Write to H. H. Laughlin, Eugenics laboratory, Cold Spring Harbor, N. Y., for a blank relating to inheritance of insanity. Fill it out and submit to him.

Melancholia.—*M. G. writes: "A woman, 45 years old, is afflicted with unnecessary melancholy thoughts, such as wrong suspicions and foolish imaginations, which cause her to quarrel with her husband and at times send her into hysteria. This is a case of seven years' standing, and is growing worse every day. Would you advise an operation as a possible cure?"*

Reply.—No. Nothing in your letter indicates need of an operation. If you have ovariotomy in mind, it will not help matters.

Mysophobia.—*Distressed Woman writes: "I am a sufferer from a disease which has been diagnosed as mysophobia by a Chicago specialist. What do you know about this disease? Are there many cases of it in Chicago? Do you consider it curable? I have had it for a number of years. Dr. Edward Spitzka of New York told me it could not be cured, but would probably wear off or pass away suddenly, and that it was foolish for me to waste money on doctors to have them treat me. A few months ago I wrote Dr. S. Weir Mitchell explaining the case and he gave me great hopes of its being cured. Do you think some new remedy has been discovered for it?*

If so, can you tell me what it is? I am in good health and apparently normal. My best friends have no idea I have any such disease, but I suffer constantly from it and would do anything to get relief."

REPLY.—Stedman's Medical Dictionary defines mysophobia as a morbid fear of defilement from touching familiar objects. The first case I ever saw was a young man who, after shaking hands, could not be at ease until he had washed his hands. I have known others who were disturbed by handling unclean paper. It is impossible to say how much of it there is in the community, as few people think of it as being a disorder. Most people who have it wonder why anybody will willingly touch an unclean thing. Unquestionably the popular public campaign for greater cleanliness is making an increasing number of people dread to touch unclean things. Some who have this point of view hide it from others as you have done. Evidently you are a nearly normal woman with a slight mental slant. It is hardly worth doing anything about it at all. A good course in psychotherapy should remove this minor mental kink.

Sign of Nervousness.—*E. L. writes: "I am a working boy of 16 years. I think I am nervous, as I am always drumming with my hands or feet or go through funny motions; sometimes my head and sometimes my whole body shakes about one-half inch back and forth.*

"I work in a printing shop and have ink and benzin on my hands all day. I have been working at this job for one month and I notice that my hands are dried and shriveled up. I use a sand soap and jelly soap mixed with a little lye (not enough to hurt my hands), but the dirt sticks in the veins and will not come out altogether, which makes my hands look dirty. Is it because my skin may not be hard enough?"

REPLY.—Drumming with your hands is a sign of nervousness. Furthermore, it is a sign of an easily controlled nervousness. If you will make up your mind to keep calm and quiet you will succeed in stopping your habit. It is natural to sway when standing. Everybody does it. The body pitches in one direction and the proper muscles in pulling it back cause it to sway in the opposite direction. A man standing still sways like a pendulum. You watch yourself too closely. You are too self-centered. You need to be with boys and girls your own age. I think you need to play ball on Saturdays and Sundays.

As your skin gets tougher you can clean it better. The ink gets in the cracks. Do not use enough lye to make your skin crack.

Biting the Fingernails.—*E. J. P. writes: "Is the biting of fingernails injurious? I have been addicted to this habit for ten years. I have broken myself of it every now and then for a short period, but found myself biting and chewing away again before I even was aware of it. How can I stop the practice?"*

REPLY.—No. You will infect your nails from time to time, causing local suppuration, but otherwise it does you no harm. However, such a habit means that you have not good brain control. You need psychotherapy or suggestion, not for your nails but for your mental development.

DEMENTIA PRECOX

PLEA FOR THE CHILD

Dementia precox is a form of insanity which affects young people. That fact is indicated by the last half of the name. One's idea of dementia is tied up with the word demented, and demented people, as most of us picture them, are dull, listless, mindless, and, ofttimes, in a state of partial paralysis.

This is the condition in the later stages of dementia precox, but the conditions found in the earlier stages are so different that they do not fit into the mental picture gained from knowledge of the later cases. If any good is to be done these cases, it must be through finding them early.

Again, any amount of sin, and misery, and various types of vice have resulted from leaving youths—boys and girls—in the early stages of dementia free to follow their instincts, when there is almost a certainty that those instincts will be determined by their mental twists.

Any physician with an asylum experience, or any juvenile or criminal court officer can tell of more than one juvenile who got into serious trouble because his oncoming dementia was not recognized.

Oettinger says: "The onset of dementia precox is at times so insidious that its victim continues long in the home, and hence comes under occasional care of the general practitioner.

"A young person, previously normal in his intelligence, in his activities and his affections, becomes indifferent, lazy, irritable, no longer amenable to home or school discipline. Formerly cheerful and companionable, he is now shy, taciturn, introspective, much by himself, yet at intervals domineering, obstinate, supercilious, or passes suddenly from depression to gayety of spirit.

"His school work lags, his duties are neglected. He ceases to acquire new ideas or apply to his acts the lessons of experience.

"Such a change in character is apt to be attributed to perversity, bad temper, or influence of companions; but loss of appetite and flesh, insomnia, or hysteriform symptoms, together with a complaint of headache, vertigo, and indefinite malaise gradually result in a visit to the doctor to prescribe for 'nervousness.'"

At times the mental condition comes on suddenly with fainting or epilepsy, like spasm or mental confusion and excitement, unaccountable apprehension or depression, hallucinations, or even by suicidal attempts.

In the more slowly developing forms, dementia precox could be mistaken by the parents for feeblemindedness, retardation, or even mental perversity.

The army is composed of young men who have passed a fairly rigid physical test and a very simple mental test. As the young men in the army are under very close observation the results of study of them give us information as to conditions among young men in general.

One of every five men discharged from the army for disability is discharged because of insanity. The rate of discharge for insanity is half again as great as the number of discharges for consumption—second on the list.

These figures do not include those discharged for neurasthenia and hysteria. About 60 per cent. of the insanity was dementia precox.

Captain King of the United States army says: "We are perfectly justified in believing that dementia precox is the first condition to be thought of when a soldier under 35 years of age is believed to suffer from mental disease. The same is, of course, true of civilians."

In 1672 Willis wrote: "Many young people, in childhood intelligent to a degree and extremely teachable so that by their learning and conversation they swept everyone with a state of admiration, afterward as they grew older turned out stupid and dull, and those who before were very beautiful in person afterwards presented no gracefulness nor comeliness in their appearance."

This is a very good description of rather advanced cases of dementia precox, as we know it today. You will note that the children started off normally bright. Thus the morons, idiots, and imbeciles were ruled out. The latter part of the quotation applies to advanced cases.

About a hundred years ago Esquiral, also quoted by Captain King, wrote: "Children are sometimes born in a state of perfect health and grow at the same time their understanding develops itself, but possess an unusual degree of susceptibility, are lively, irritable, choleric, of a brilliant imagination, a well developed understanding, and an active mind. Their understanding remains stationary, making no further advances and the hopes recently raised so high are dashed forever."

Or to put it another way, a child is normally bright up to about puberty. He then develops a general "cussedness," has no power of sustained attention, is of no account, lazy and shiftless, may run away from home, lacks ambition, his personality changes, his ideas are incorrect or bizarre or jumbled; later he becomes stupid and hallucinations and delusions develop.

The boy may be slipping for years before it becomes certain that he is insane. The parents notice that he is not as bright as formerly, but they do not think it of consequence. They think the boy is sulking or perhaps that he is developing some of that antagonism to parents which is not very abnormal in the rapid changing of the puberty period.

It is the natural time for new connections to be made and for the home connections to lose some of their dominance. The parent does not differentiate between these changes and the changes of dementia.

The school teacher is in a better position than the parent to judge of developing dementia precox. Especially is this true of the university, college, and high school teacher. The army discovers many dementia precox boys. Do the schools? If not, why not?

That is the object of these two articles: To put before parents and teachers the plea that children who are markedly different from other children be not allowed to drift on, waiting for something to turn up, but that they be carefully studied by someone qualified to advise.

Dementia Precox.—*Mrs. N. W. writes: "What is meant by 'dementia precox'?"*

Reply.—1. Dementia precox is a form of dementia which develops in young people. It is usually first recognized about the beginning of puberty.

CHAPTER XXV

Diseases of the Nerves

CONVULSIVE DISORDERS

When one looks through medical books he finds little about convulsions. If the mother of a young baby were writing such a book she would start with convulsions, and some of the present contents of the books would be in the appendices.

Of course, convulsions are not a disease at all. They constitute only a symptom. But of all symptoms, they are most dramatic and terrifying. To a mother convulsions carry more meaning than do long Latin names and talk about bacteria.

In babies the character of disorders is profoundly modified by convulsions. Sometimes they usher in the illness; sometimes they come at its height; sometimes they close the baby's lifebook. But at whatever period they come, they constitute the bold, outstanding feature of the illness.

Many baby disorders start with spasms. Such is a case of infection with the pneumonia germ and with the ordinary germs of contagion, such as measles and scarlet fever.

Where an infection starts with a convulsion, there is little danger that the convulsion will be repeated, the one outburst seems to have used up the stock of powder. But an infection which begins with convulsions will be of more than average severity.

We speak of convulsions beginning an attack, but they do not properly begin it. A child, peevish and irritable all the morning, will suddenly go into convulsions. Had the mother examined closely, she would have found the child with fever and suffering from headache, but, at that, nothing in the symptoms indicates that so alarming a condition as convulsions is on the point of developing.

Perhaps the child has been left sleeping restlessly, when the mother is summoned by a scream from someone who has discovered the baby with head drawn back, eyes rolling, limbs jerking, and mouth frothing. When the mother catches baby up, she notes that he is unconscious.

Presently the child sighs, as the convulsion passes off, but from time to time a jerking indicates that he is still on the border line. Consciousness returns slowly. If the temperature is taken, considerable fever is found.

When the doctor arrives he finds the baby unconscious, restless, grinding its teeth, and starting from time to time. The cold head cloths and the hot bath have reduced the fever a degree or two, but it is still around 105°.

As the child is still partly unconscious, he probably will not try to give medicine by the mouth, but will give some sedative and something to pull the

temperature down by injection under the skin, rectal, or both, giving an opiate or emetic under the skin and an antipyretic by rectum.

Within a few hours the child is conscious; the temperature is down, and the infection proceeds on its more usual course.

Why the convulsions in this group of cases? The nervous system is profoundly poisoned. The cells of every sort react. The reaction of the motor cells produces the convulsions, and that symptom is so prominent that everything else is forgotten.

The common idea that the infection has struck in has a grain of truth in it. A hot bath to bring the poison to the skin, sedatives to steady the nerve cells, to stupefy and thus protect them—these are the things to do approved by custom and essentially right, although, like some of the other things that are right, we do not yet know enough to know just why they are right.

When contagion starts with convulsions the mother is more alarmed than she need be. The immediate danger is not great. However, as I have already said, the attack of the contagion will probably be a severe one.

When convulsions develop in the course of a disorder, it is a graver matter. Here, too, the nerve cells are being overpoisoned. If they are able to react they do so. If the baby is thoroughly exhausted the nerve cells cannot react. Convulsions imply a fair amount of vitality.

On the other hand, convulsions twang the cords of life. If the illness has been running some time, the twanging of the cords may snap them.

Children with rickets are prone to have convulsions. Poisoning that would not greatly disturb another child will throw a rickety child into spasms.

Not infrequently epilepsy begins in infancy. A mother who has had the scare of her life from finding her baby in convulsions cannot understand how any mother would be willing to trust her baby to outgrow convulsions, and yet many women follow this policy.

"Familiarity breeds contempt" for anything. After a mother has seen her baby recover from convulsions a few times, she loses her fear. Some of the repeated convulsion disorders of infancy may not be of great consequence, but anyhow the condition should be carefully inquired into.

It may be that the baby is an epileptic. Epilepsy often shows itself in infancy, to stop during childhood and reappear in later life. The question blanks of epileptic colonies on which are recorded the personal history of the applicant always contain questions about convulsions in infancy and childhood.

It may be that the convulsions mean nervous instability of some sort other than epilepsy. However that may be, two facts of importance stand out: Babies and children prone to convulsions should be differently watched over, especially as to their mental and nerve habits and their digestions, from other children.

Convulsive nervous disorders in infants and children are more amenable to treatment than in older people. Convulsions in older children are generally laid to worms.

No kind of worms produces convulsions.

Therefore, when a child has convulsions, dig for the cause. To call

it worms and let it go at that is not fair. It may be the only manifestation of a meningitis infection, a scarlet fever, or a pneumonia, or it may be the onset of these, or some other infection. Possibly the worms may result from errors in eating: whereupon a complete cure will follow free vomiting and a big dose of oil. It may be epilepsy.

Grown people have spasms. The best known of these are the spasms of epilepsy. By best known I mean many people know about epilepsy. As to the nature of epilepsy and what causes it, little is known.

However, there is a vast difference between the watched over, the controlled epileptic and one that is neglected—which means that much can be done for epileptics.

Grown people have convulsions from the poisoning in the course of these diseases in which waste accumulates in the body, such as the convulsions of Bright's disease and a kind of kidney tumor, known as hypernephroma.

Except in epilepsy, the convulsions of grown people are more serious than those of children. The nerve cells are more solid; they sit more securely on their bases; they are not so easily turned over or fussed up. When they do fuss up enough to produce a spasm it can be inferred with safety that the cause is no matter of minor consequence.

On the other hand, the grown person has a better hold on life than the baby. The twanging of the cords is not liable to break them. Where death follows convulsions in Bright's disease, a period of unconsciousness, usually of more than a day's duration, intervenes.

The element of spasm enters into a great many disorders. I mean here local spasm—spasm of a group of muscles. Such spasm is a milder affair than the general muscle spasm, known as convulsions.

Of these partial spasms an important one is St. Vitus' dance. St. Vitus' dance is almost a matter of public health; it occurs so frequently in school children as the direct result of bad governmental methods—that is to say, bad school methods.

It is true that underlying it is an unstable nervous system, inherited usually from parents who are nervous, neurasthenic, hysteric, or worse. But the exciting cause is badly ventilated, overhot schoolrooms and school tasks that result in fatigue.

The badly ventilated school rooms mean enlarged lymph glands, enlarged tonsils and adenoids, frequent colds and rheumatic pains, called growing pains. Another result is pallor. Fatigue causes the break to show itself in the nervous system. Pallor, anemia, rheumatism, and St. Vitus' dance all form parts of the same picture.

Why the jerk, the symptom which dominates when the case is one of chorea? The fatigued, tired nerve cells explode about every so often, and the muscles connected with them jerk. This, on a larger scale, is what happens in convulsions.

In chorea nobody treats the muscular contraction. I once read from an old author that the treatment of convulsions was to hold the head still. Somewhere about the same time effort was made to restrain the choreic movements.

Now the proper procedure is to do everything possible to divert attention from the movements. For the other children in the schoolroom to notice

them is bad for all concerned, including those who notice them. When they are noticed they get worse.

The proper plan is to stop the cause. The cause is usually tied up with the school. Ergo, stop the school. This is a gross way of stopping the two causes in the school doing the harm.

A better plan would be to find a school where the teaching is by play in the open air. The best tonics, by long odds, are play in the open air and the features that attend.

The next best tonic, and the best tonic that comes in a bottle, is arsenic.

Don't let this escape you. The tonics that come in bottles are never in the same class with those that come under the head of personal hygiene.

Coming to adult life, we find that there are many spasmodic disorders that do not involve all of the motor apparatus, and many disorders that have spasmodic features engrafted on them.

As an example of the latter we have asthma. Asthma is an ordinary bronchitis on which there has been engrafted the element of spasm. The other features of the bronchitis act on the spasm feature, making it worse, and the spasm features act on the other features, making them worse.

In consequence asthma produces distressing symptoms, and tends to persist indefinitely. But when the lungs are opened up and the tubes are explored, little trouble is found.

There are cases of heart asthma. In such cases the heart is profoundly changed. There are cases of kidney asthma. In those the kidney is found profoundly changed. But whether it be heart, kidney, or plain asthma, little is found in the lungs and bronchial tubes.

The element of spasm, besides producing discomfort, abets the bronchitis enough to keep it going where otherwise so trivial a bronchitis would be easily overcome.

Another of the partial spasms, disturbing, but of no great importance otherwise, is the spasmodic tics. These are the jerks not infrequently noted in people looking well otherwise.

The real physical harm is inconsiderable. Occasionally sleep will be disturbed or nutrition will become poor; but, generally speaking, the harm done may be classed as social.

The affliction is noticed and the affected man notes that it is noticed. He is kept in a state of uninterrupted self-consciousness. It obtrudes when he is discussing a business proposition. He cannot go on with his work on the same basis as the ordinary man. Some occupations are entirely closed to him by his infirmity.

If it were possible for him to live a successful, isolated life, he would be just as well off as anybody, but that is seldom possible.

What the affected person wants is that his infirmity should not be noted. Sympathy is about as foreign to his wishes as blame. Yet some people are not disposed to be fair with these people.

The jerks usually stop at night. They get worse when they are observed. From these two facts the conclusion is drawn that the condition is due to hysteria, or an exaggerated ego, a liking to be odd, or some similar mental perversity.

In the first place, if this were true, the individual is still a subject for help and sympathy rather than censure.

These perversities, by wise help, can be reached. Censure does not accomplish any good. The victims are variations from the normal. In a certain sense they are sick people.

In the second place, for these jerks and bad muscle habits there is usually an organic basis. The matter is beyond the control of the subject. His efforts to control it make it worse. The nerve cells or the nerve fibers are diseased.

The cure is to cut the nerve or kill it with an injection of alcohol. Sometimes this can be done. Just as often the nerve cannot be reached, or it cannot be done for some other reason.

Thought about this class of disorders suggests this bit of personal hygiene:

It is never wise to permit oneself to develop little muscle movement habits—for instance, drumming with the fingers, working around the nails, blinking the eyes, drawing down the corners of the mouth.

ST. VITUS' DANCE

Soon after the school work begins there is a moderate outbreak of St. Vitus' dance. Some children, accustomed to the free life of the summer season, chafe at once upon being confined during school hours, and from this chafing results the form of nervous breakdown called St. Vitus' dance.

That is the exceptional course. The rule is that the nervous children quiet down after a few days. Then they run an uneventful course for some weeks. Then the mothers note that they tire easily; they complain of headaches often; they are flabby. Some of them have night terrors, some are restless in their sleep, dream all night about their school work, and wake up in the morning unrefreshed. Some are irritable, cross, sensitive; some are fidgety.

A close observing mother will accept these symptoms for what they mean—a lack of nervous poise—and, warned by them, will seek to avoid trouble. Her child is suffering from overwork. It may be that the work would not even be hard work for another child, but for this one it is overwork. It may be that it would not be overwork in a cooler, or better ventilated, or a clean or quieter schoolroom. Or it would not be overwork if the child's sight were better, or the blackboard did not shine, or the light were not so bad.

If the warning is not heeded the child persistently begins to jerk—perhaps a hand, shoulder, or head; or there comes a facial twitch. It does no good to scold or blame. In fact, it does harm even to notice the peculiarity.

It may be that the mother knows that her child has seen some other twitching child and is imitating him. The fact that the spasm is the result of imitation does not mean that the imitating child should be whipped or even scolded.

If the condition is left unattended to the jerking may be so violent

as to keep the child in bed. Or the joints may become inflamed, the condition being then called acute rheumatic chorea.

In reecnt years we have learned that in rheumatism bacteria are circulating in the blood as well as resting in the joints. This explains why so many girls with rheumatic chorea develop heart disease and why some of them die.

When the jerking is noticed the parents must get busy to discover where the trouble lies. If the school ventilation is bad it must be improved or the child must drop out of school. If the eyes or the throat are wrong the condition must be remedied.

Whatever be the cause and however completely it can be removed, the probability is that the child should drop out of school for a while; live a simple life in the open air; take an iron and arsenic tonic, and eat simple, nutritious food.

EPILEPSY

One of every five hundred persons is an epileptic. When a subject is of immediate personal interest to one-five-hundredth of the people and of interest to more than four times as many, it is time to talk about it. Even if the majority feel that it does not interest them, and would prefer not to hear about it, they should be willing to put their preference aside when the interest is so wide and so appealing.

Epilepsy is so dramatic in its manifestations that it has always been known. Even savage minds had no trouble in knowing epilepsy. In the first writings that have come down to us the disease is described under the name *morbus sacer,* the sacred disease. One who has seen an epileptic in convulsions can readily understand why men at the dawn of civilization thought epileptics possessed of spirits.

We have made but little headway since the first man knew epilepsy. No cures have been discovered, no bacteriology or chemistry or other science of its cause has been worked out. No Virchow, Cohnheim, or Welch has used his scalpel or microscope to demonstrate a pathology.

In the history of the disease the dates are those of some unusual type discovered in one year and some other type in another. But the record of accomplishment does not run deeper than symptoms—the surface of things—and, at that, the last entry was made nearly a hundred years ago.

Seventy-five per cent. of epilepsy is the ordinary convulsive type known to almost everybody. The other 25 per cent. is divided between petit mal, jacksonian epilepsy, psychic epilepsy, and three or four less typical forms. No typical epileptic goes long without his condition being recognized.

However, probably more generalized information about night terrors, violent dreams, momentary loss of consciousness, passing clouds that hold one speechless for a fraction of a minute, momentary rigidities, sudden frenzies, running amuck; more generalized knowledge and more careful studies of these will show that many of them are epileptic manifestations. When these are added to the list of epileptics the number will pass one-five-hundredth of the population, and the more atypical epilepsies will make up more than 25 per cent. of the whole.

Spratling quotes Gowers, the great English authority, as saying:

"Epilepsy is an inherited disease. There are few diseases in the production of which inheritance has a more marked influence, and the influence traceable is always far less than that which exists."

In a study of 2,523 cases Spratling found that 16 out of every 100 were due to inheritance. This was similar heredity. By similar heredity is meant that some of the antecedents of the epileptic were epileptic.

There is another type of heredity called dissimilar. For instance, alcoholic parents are liable to have epileptic children. Spratling found that 15 per cent. of 1,070 epileptics had alcoholic parents—a form of dissimilar heredity. Bearing collaterally on this point is the observation that hard drinking, middle aged men, leading sedentary lives, are prone to develop epilepsy. Of this 1,070 Spratling found that 13 per cent. of the men and 7 per cent. of the women had insane parents.

About half a century ago Bemis of New Orleans came at the question from another side. He studied 833 families of whom the parents were close cousins. There were 3,942 children, of whom 1.5 per cent. were epileptics—over seven times the general average of the community.

Davenport, in his chapter on epilepsy, says that it follows the same law as feeble mindedness. In the inheritance laws, epilepsy and feeble mindedness are almost interchangeable. Several family trees showing the relation between the conditions are shown in Davenport's book.

Other writers have discovered that families in which there is an excess of chorea, of migraine, or of neurosis also carry an excess of epileptics—all illustrations of what is termed dissimilar inheritance.

Now, Spratling, combining similar and dissimilar inheritance, says that 60 per cent. of epilepsy is inherited. Eight per cent. of epilepsy is due to brain hemorrhage, and the kinds of brain hemorrhages most frequently causing epilepsy are those due to injury at time of birth. Birth accidents are largely responsible for epilepsy. They are responsible even in some cases when the spasms do not start until the child is several years old.

Fright or shock was found to be the cause in 3 per cent. of the males and 8 per cent. of the females in a study made at the Craig colony. However, it was found that the people in whom fright had induced epilepsy had unstable nervous systems before the shock. Shock does not seem to be able to cause the condition in a good, sound, level headed person. Blows on the head, fracture of the skull, and similar injuries are responsible for 7 per cent. of the epileptics.

An idea that eye strain causes epilepsy is fairly widespread. Acting on this theory some men have sought to cure, in fact, have advertised cures of epilepsy by fitting glasses.

Ten years ago some careful eye specialists went to the Craig colony and studied 900 epileptics from this standpoint. Out of the number they found 68 in whom there seemed possibility enough to warrant experiment and observation for a year.

Their conclusion was "that cases of epilepsy due to eye strain are of extreme rarity, if, indeed, they are ever encountered; while cases due to this cause that can be cured by glasses alone, not counting those whose attacks may be suppressed, are more infrequent still."

On the latter point, they say: "It appears that in some cases proper glasses—just as the bromids—have the power to hold attacks in abeyance, but they do not possess the power to cure."

Sometimes, under bromids and other forms of treatment, the attacks miss for months, and, occasionally, for more than a year. The happy patient is liable to conclude that he has been cured. It is this that Spratling refers to in speaking of "attacks held in abeyance," "attacks suppressed" but not cured.

A peculiar relation is that which sometimes exists between the attacks and sleep. Epilepsy that is characterized by night attacks is most insidious and incurable. An individual may have night attacks for years before he has any spell during his waking hours. If he changes his sleeping hours, he finds that his spells also change. It is sleep and not the night attack which "sets off the alarm." In some cases the attacks come just as the sick one drops to sleep; in others just as he awakens in the morning; in still others somewhere in between.

Just why dropping to sleep should "set off the alarm," it is impossible to say. But, for that matter, the sudden development of spasms or a momentary catalepsy is a puzzler. Usually, there will be a few hours of a somewhat muddy mind, then a sudden, violent explosion. Perhaps the breath is suddenly become offensive, the temperature almost instantly rises; the urine is highly colored, scant, and full of indican.

As soon as the spell has been fully recovered from, the mind is acute, and the muscles are sore. But the mind is more alert than for days, and the urine is abundant and clear straw color in appearance. It is as though a thunder shower had cleared the air.

We see much the same sequence in migraine. The attack usually begins with an aura. Two thousand years ago Pelox wrote that the fit began "as a spirituous vapor in the veins of the extremities and ascended to the head, when the patient became unconscious." This is a pretty fair description of this aura.

The aura sometimes consists of flashes of light or objects seen suddenly to balloon out or shrivel up. Sometimes it is the ears that are disturbed. Then there are "roarings" or "voices" or the "sound of sea waves." Or sometimes it is the taste—with a bitterness like quinin or a sourness like lemon. Or it is a gnawing at the stomach which floats up to the head.

In practically all cases there is some sort of mental aura—a feeling of joy or a sense of doom, or a half-sensed appreciation of the oncoming spell, and some kind of an attempt to forfend in some way against accident. Sometimes no permanent register of this emotion remains in the brain, but anyone who has studied the face of a patient toppling over has seen it written there.

After the spell, the patient who is indifferent to his condition is in good mental shape. Ofttimes, however, the patient has been hoping for better things, and his disappointment results in a few days of mild melancholy.

About 8 to 10 per cent. of the cases can get well, says Spratling. Nobody can tell which of the cases are curable and which incurable, except as the result of months of careful observation and study. That which is to be studied is not the disease [for of that we know, and can know next to nothing], but the patient.

This serves to introduce the most important part of this article, in view of the present shortcomings of our knowledge of the disease. Epileptics differ from their fellow men. Things that their fellow men can do with safety are too hazardous for them. They do not fit well into crowded streets, rushing cars, and automobiles, into elevators, engines, and machinery. Ofttimes they can do their work, and do it well, but not under the conditions safe for you and me. They are not insane; ofttimes they are sensitive and high strung. Some are excellent citizens. Healy says some are "the most dangerous criminals," pleasant one day, vicious the next, committing heinous crimes.

They are peculiar people. The liberty of the streets is not liberty for them, for the fear of an attack, as well as the hazards of the streets, deprive them of liberty. They are misfits in asylums, and asylums are misfits for them. Prisons may be the place for a few, but so they are for those not epileptics. It would be as sensible to confine all men as all epileptics. Poorhouses? No.

The answer? Says Shanahan:

"A colony can be so arranged as to properly cope with the peculiarities of the epileptic. Here a suitable occupation can be provided, such as his physical and mental condition will permit.

"The epileptic is about normal about 95 per cent. of the time. A proper plan for him is one in which he can be accomplishing something during this normal time, content and happy because he knows that, in his 5 per cent. abnormal time he will not be in danger of being run over by a street car, or he will not be overcome in some school, church, public gathering, or in business or social life, and be thereby horrifying to others and humiliating to himself."

The Illinois Committee of Fifty quotes the average per capita earning at Sonyea, N. Y., as $35 a year. As time goes on and more early stage, bright minded epileptics come to regard Sonyea as a refuge and as means of individual work, each according to his talents, the per capita earnings should increase to a figure materially beyond $35.

Dr. Peterson describes the employment as being many and varied. The schools care for the children, the adults work on dairy farms and in vegetable gardens, doing a dozen or more kinds of factory and shop work. Nowhere, however, is there a field for the proper use of the capacities of brain workers.

Dr. Flood of Massachusetts says, where, a few years ago, the epileptic was stupefied with drugs and made to live a living death under colony régime, sedatives are used as little as possible, and an effort is made to find the best treatment in each case.

Strangely enough, the same agents which are beneficial in combating tuberculosis are of the greatest benefit in these cases. Work in the fresh air and good, wholesome, and carefully chosen foods are more essential than medicine. In addition, there is the opportunity for prolonged and individual study of the case—an absolute necessity, as stated above, for the proper care of a case of epilepsy.

Nor should we forget that in colony life there is a partial solution of the problem of inherited epilepsy, not a whole solution, for, as I have written,

a part of the inheritance is dissimilar. *Epileptics are born to alcoholic parents, to migrainous parents, to neurotic parents, to insane parents, to feeble-minded parents, to closely related parents, as well as to epileptic parents. Therefore, the colony is but a partial solution of the problem of inherited epilepsy.*

The Committee of Fifty has issued a pamphlet entitled: "How the Uncared for Epileptic Fares in Illinois—Colony Care the Remedy." From this bulletin we learn that the colony plan originated in Germany in 1867. At the present time Germany has fifty colonies; Switzerland, three; Holland, two; Australia, one. In this country there are colonies in Massachusetts, Ohio, New York, New Jersey, Kansas, Connecticut, Texas, Indiana, and Virginia, and, in addition, Michigan and Minnesota provide a modified institutional care.

Ohio began twenty-three years ago. New York followed suit nineteen years ago; Massachusetts started four years after New York, and New Jersey stepped out with the Bay State. Kansas and Texas began in 1902, Indiana in 1905; Virginia and Connecticut were the last additions in 1910.

Amending the methods of caring for epileptics proceeds more slowly than amending the constitution of the United States, but it develops a few steps every few years. The colony method will presently be general in the states.

Some epileptics can be cured. In most epileptics the frequency of the convulsions can be lessened, and the seizures can be made less severe—all of this in spite of the mystery of epilepsy, for concerning the cause of epilepsy nothing is known. In the history of medicine theory has followed theory in the speculation as to the cause of epilepsy. Every science has been made use of in its investigation, and still the mystery remains.

A few inheritance facts are known. It sometimes runs in families. It frequently manifests itself in the children of chronic alcoholics. It frequently manifests itself in children born of parents or a parent drunk at the moment of conception. In a stock it is frequently interchangeable with other neurotic manifestations.

Clinically, it seems somewhat akin to migraine and to hysteria. It can sometimes be connected with head injuries.

A few isolated facts of this nature are about all that is known, and these facts do not tell us much about the nature of the disease. But here is one observation that every epileptic should know about. It is that most epileptics are greatly benefited by a proper regard for personal hygiene.

Caesar was an epileptic from childhood on. He was most abstemious in his eating and drinking, kept his skin in perfect condition, his muscles always elastic, and his secretions in good condition.

Mohammed was an epileptic. Few characters in history have lived more simply and kept their bodies in better condition than did Mohammed.

Byron, whose father was an alcoholic and whose mother was a neurotic, was in convulsions when born. For a while in his early manhood he neglected himself and grew obese. By most abstemious living he reduced his weight from 240 to 160 pounds, and by abstemious living and systematic exercise kept his wind good ever afterward.

When a person learns that he is an epileptic he is prone to grow timid, shy, diffident. In time he loses aspiration and ambition, and before long be-

comes slouchy, both mentally and physically. Wood says epilepsy is not inconsistent with a life of utility, nor even an important career.

Besides Byron, Mohammed, and Caesar, many other men of great achievements have been epileptics. Perhaps St. Paul was one; many say that Napoleon was an epileptic.

Many governors, mayors, senators, congressmen, professors, and men of learning and letters have won out in spite of epilepsy.

In spite of the little known of the exact nature of epilepsy, experience has taught us that the epileptic who obeys the laws of personal hygiene and who refuses to give way mentally and spiritually leads a life of usefulness.

Treatment for Epilepsy.—*Daily Reader writes: "In answer to my inquiry about mild epilepsy, you say: One out of ten can be cured; more are often benefited. May I ask, what is the treatment for epilepsy? How can this awful malady be cured? May I also know the main cause? You say overwork is not the main cause. A person seems to get spells when he worries over business. Blood only 66, is this too low? I do not understand cubic millimeters. May I also ask how long treatment must be kept up after the spells stop?"*

Reply.—1. [a] When possible, find the cause and remove it.
[b] Simple life in the open air, such as the inmates of colonies follow.
[c] An abstemious diet.
[d] Proper habits, particularly as to excretions.
[e] Freedom from worry, anger, or other violent emotions.
[f] Tonics, bromids, and other medicines, as required.
2. Among other causes are:
[a] Inheritance.
[b] Injuries to the head.
[c] Lack of balance between the secretions of certain ductless glands.
Attacks are precipitated by:
[a] Anger, worry, or other emotions.
[b] Constipation.
[c] Bad habits.

3. Sixty-six per cent. hemoglobin is too low. It means a fairly considerable anemia. Ninety to one hundred is normal.

4. Blood corpuscle counts are usually expressed in number of cells per cubic millimeter. A cubic millimeter is roughly one-six hundredth of a drop. Do not try to remember that. Remember 5,000,000 red cells and 8,000 white cells as normal, and abnormalities in proportions of 5,000,000 and 8,000 respectively. For example, 4,000,000 red cells constitute 80 per cent. of the normal; 16,000 white cells, 200 per cent.

5. Drug treatment but a few months; the hygienic treatment continually.

Care May Cure Epilepsy.—*J. B. K. writes: "A 12 year old girl has had epileptic spells for three years. Is there any probability of outgrowing it? Is there a Hebrew institution for such afflicted children? If not, which are the public or private homes for this ailment?"*

Reply.—1. Epilepsy will not be outgrown. Sensible care, persistently carried out, cures one case in ten. In addition, in many cases not in the incurable group, good care greatly reduces the frequency of the attacks. To an exceptionable degree in epilepsy is there response to proper care—

greater safety, greater happiness, an increase in general wellbeing, fewer attacks, and, sometimes, cures. On the other hand, drifting—leaving the patient to outgrow it—makes for harm.

2. I doubt it. I have not been able to learn of any.

3. Many states have epileptic colonies. Ohio, Massachusetts, New York, New Jersey, Kansas, Connecticut, Texas, Indiana, and Virginia, and Minnesota and Michigan have some provision for care of epileptics. Outside of these I know of no public or private homes for the disease.

Looks Like Epilepsy.—*D. A. C. writes: "Are adults as subject to worms as children, and how do these parasites become located in the intestinal tract? Would a person having an inordinate appetite, especially for sweets, being also subject to fits or spasms, in which he falls down, his fingers twitching spasmodically and eyes fixed in a vacant stare, possibly be troubled with worms? How should a person be treated while in one of these spasms? Is it likely that a person would be troubled with worms and worm spasms for a period of five years or longer? Would you advise anyone so troubled to consult a physician, or is there some reliable medicine on the market that will do the work?"*

REPLY.—I suspect the party referred to has epilepsy. Certainly the condition is not due to worms. Have a physician pass on the case. Worms of the ordinary kind do little or no harm. They do not cause spasms. Adults are subject to worms, but are not as frequently infested as children.

Epilepsy Rarely Curable.—*L. M. wants to know if epilepsy is a curable disease. What can be done with an epileptic? Are epileptics insane?*

REPLY.—As a general statement, epilepsy is incurable. There are some exceptions. But many epileptics, by keeping in good physical and mental condition, can cause their attacks to come at long intervals and the progress of the disease to be slow.

On the physical side constipation is to be avoided. On the mental side paroxysms of emotion, such as anger, grief, and melancholy, are to be refrained from.

Most epileptics are useful members of society for the first ten years of their disorder, but attacks and the conditions which lead up to them are very wearing on the brain substance. In time the central nervous tissue is worn down and the epileptic becomes of poor judgment from overemotionalism, or insane, or demented, with a brain prematurely old—senile.

Careful living and, particularly, good control of the mind, decrease the frequency of attacks and spare the brain some unnecessary wear. Some states have colonies for epileptics. In those states epileptics get on best in these colonies. Other states have no provision for them.

Value not Proved.—*G. A. writes: "There has recently been brought to my attention the work of Dr. Ralph Spangler of Philadelphia. He treats epilepsy with rattlesnake venom, and I have been told has had great success. Could you give readers an opinion on this method of treatment?"*

REPLY.—The treatment with snake venom is in the experimental stage. The indications are that it is not of much service.

Mild Epilepsy.—*M. L. S. writes: "1. Can mild epilepsy be cured in a girl 19 years of age? Never had an attack until she was 19; had three then in ten days. 2. Does bromid always affect the brain? 3. Would you*

advise discontinuing bromid in this case? What brought on these attacks at this time of life?"

REPLY.—Some forms of epilepsy are fairly curable. Most forms are controllable; some are hopeless from every point of view. An epileptic should remain permanently under good medical control to the end that the most useful life possible may be worked out for him. Most states have epileptic farms where the patients live under circumstances that give them the best chance possible.

No Epileptic Colony.—*H. A. M. writes: "I know of a man who, at the age of 45, proved to be an epileptic. Will any of his children develop this at the same age? Might his grandchildren inherit it? Is there any institution in or near Chicago where such people may be taken care of?"*

REPLY.—Probably not, especially if the other parent is of good, level-headed stock. Illinois has no epileptic colony. Several states have. If the man is sane, there is no institution for him.

One Chance in Ten.—*Reader writes: "Can mild epilepsy, brought on by overwork and nervous breakdown, be cured? A man 34 years of age has had it about one year. What is normal blood count for a man?"*

REPLY.—1. Mild epilepsy can be cured one time out of ten. It can be benefited more frequently still. Overwork may be a contributing though not a main cause. When overwork is a factor, rest will help.

2. The normal red blood count is 5,000,000 red cells per cubic millimeter; the normal white blood cell count is 8,000.

No Institution for Epilepsy.—*Anxious writes: "Is there a cure for cases of epilepsy? Is there any institution in the State of Illinois devoted entirely to the care of epileptics?"*

REPLY.—A small proportion of the epilepsy is curable. Most of the victims by properly regulating their lives can be spared many attacks, and the progress of mental deterioration will be slow. Illinois has no institution devoted entirely to the cure or the care of epileptics.

PARALYSIS AGITANS

Some men stand so solidly, so like a stone wall, that tottering, wavering, tremors seem wholly out of the question; yet even those most like a solid wall are constantly rocking like a ship at sea. They pitch forward a bit and the muscles of the back pull them in the other direction, and so it goes all day long. There is some tremor about even the most quiet, best controlled hand, but effort of the will can control most of this.

Paralysis agitans is a disease in which this tremor is grossly exaggerated and wholly beyond the control of the mind. Thinking about it makes it worse. When the brain tries to control the trembling hand, the tremor redoubles.

A common test for paralysis agitans is to give a man with a tremor a full glass of water and ask him to drink without spilling it. The glass will shake so as to spill a good part of the water.

Many people do things less well when they concentrate their minds on

them. In paralysis agitans this rather general propensity is exaggerated out of all proportion.

A more important, though less easily recognized, symptom is a persistent muscular rigidity. The muscles, conscious of their weakness, hold the head, the body, the arms, and sometimes all in positions and attitudes of rigidity.

As to the cause very little is known. Some writers think the nerves which control the muscles have grown old before their time. There is but little basis for this opinion.

Some think that there are senile changes in the muscles themselves. There is not much evidence to support this view, though there is more than that behind the first.

Another group believes that it is due to disease in some of the ductless glands.

Just outside of the thyroid in the neck is a small gland called the parathyroid. It has been noticed that when this gland has been wholly destroyed the patient died in the midst of spasms and that when it was partially destroyed the patient developed different kinds of jerks.

In a few cases of paralysis agitans changes have been found in these glands. Such changes are not very marked nor very constant.

Acting on the little evidence of one sort and another, a few physicians have given extract of parathyroid in paralysis agitans. In about two-thirds of the cases in which it has been tried it has given favorable results.

That is not very conclusive, but it would seem wise, for early cases at least, to give parathyroid an extended trial. Ordinary drugs are of no service, and nothing is lost by not making use of them. Old, long-continued cases with advanced changes and settled conditions cannot expect much from anything.

Causes Remain Mystery.—*J. E. L. writes: "1. What are the symptoms of paralysis agitans? 2. What are the causes of this affliction?"*

REPLY.—1. Trembling gets worse when one tries to control it. For example, when it affects the hands, if the person tries to drink from a full glass of water the trembling gets worse.

2. Nobody knows.

Marry Him.—*Miss M. G. writes: "I am going with a young man and he wants me to marry him. His mother is 45 years old and has shaking palsy. Her doctor tells her she cannot get over it. I have noticed the young man when he takes a drink of water and his hands do not tremble any more than anybody else's. If I marry him will our children have shaking palsy? Will he get it when he is 45?"*

REPLY.—There is no evidence that shaking palsy or paralysis agitans is inherited. Your children will be in no special danger. Marry him. He is no more liable to develop shaking palsy than anybody else. Live within your income and otherwise do all you can to keep him from worrying. Protect him so far as you can against shock and great nervous strain and you will have done your part in shielding him against paralysis agitans.

HUNTINGTON'S CHOREA

Many years ago a person suffering from a rather strange disorder came into the state of Pennsylvania. He located in the country. He was constantly jerking and twitching. His family grew up around him. In time his twitching grew worse, and it was noted that his mind was failing. He had the sympathy of the people of the neighborhood.

The children seemed healthy and well balanced. When he died the neighbors went to the funeral, and then helped the widow and children to readjust themselves.

Years passed, and the children, having become of middle age and themselves the parents of children, began to twitch and jerk.

The older neighbors remembered that the old parent, the first of the family known to them, twitched in the same way. Time passed, and they remembered that the progressive weakness, insanity, and death constituted just the course the infirmity of the parent had followed.

Still the neighborhood had no emotion, and certainly no thought except one of sorrow. For some reason a curse was laid on this man, and it had remained to the second generation.

That right in the simple countryside there was growing up a great menace, a great public enemy, or that the occasion called for governmental control never occurred to those good-hearted people.

The disease was Huntington's chorea. It is inherited. It got its foothold in a single family in western Pennsylvania, and down this strain it has run into the other families to which this stock has contributed. Now it is rather widely distributed over the United States.

But back of the Pennsylvania case there lies some history. On the tip of Long Island there lived an isolated community of fisher folk. They lived to themselves and married among themselves. Presently it was noticed that some of the people began to develop a tremor when they got to middle life. Those who developed this trembling in time became feeble minded.

Among the people of this community was a physician who did not look on this nervousness as a part of the day's work. He noticed that it ran in families. As it never showed itself until the middle of life had been reached, the subjects were married and had families. The name of this doctor was George Huntington. He observed all the facts and established the relation between them. The disease was given his name.

During the first forty years of life the patient to be is free from trouble. Then a twitching begins. As more or less unsteadiness is to be expected in middle life, the disorder is unnoted. It becomes worse.

For a while the movements can be suppressed by effort of the will. The speech gradually becomes slow and difficult. The movements, which at first affected the extremities, extend to the face. They reach the stage where excitement makes them much worse.

It is noticed that the mind is not of the former fiber. The mental degeneration increases until insanity results.

For the cure of the disease nothing can be done. The afflicted should have the care required. They should have sympathy. The sympathy, instead of

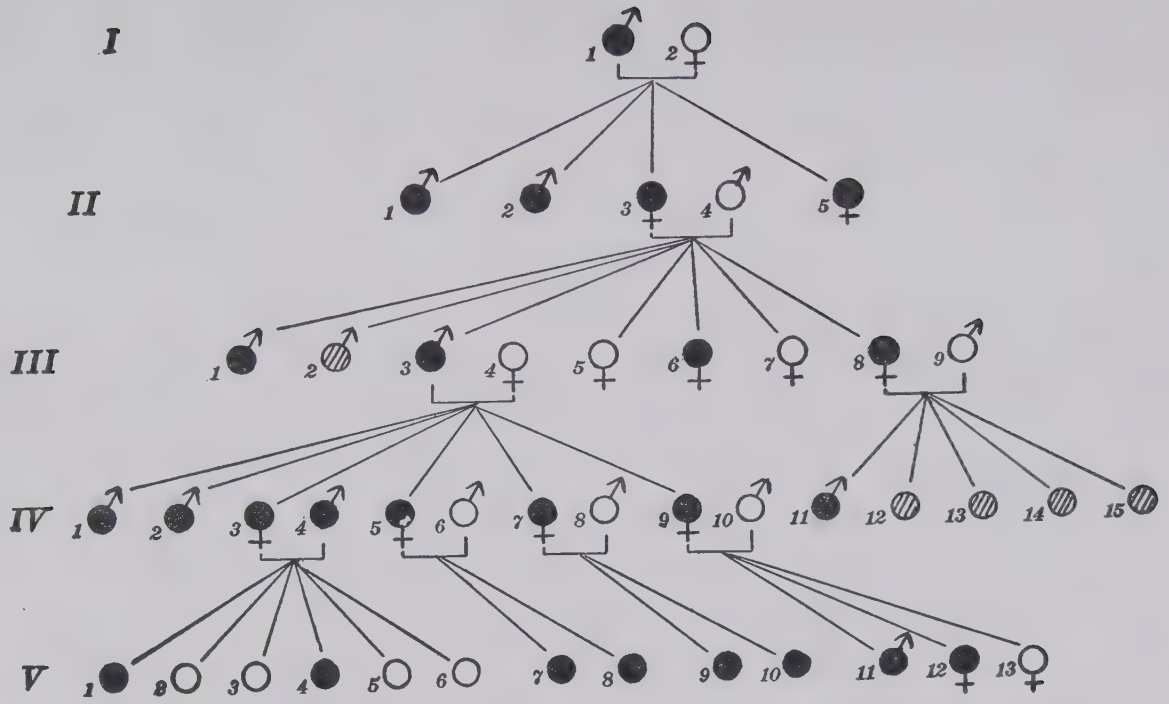


FIG. 162.—FAMILY HISTORY SHOWING HUNTINGTON'S CHOREA. Last generation incomplete. (Data from Hamilton.)

Black circles = cases.
Light circles = persons not affected.

being temporary and intermittent, should be continuous. It should be far-reaching. It should be so farreaching that it should protect the next generation.

As the disease does not manifest itself until after thirty, the hereditary relations may be lost sight of. The sympathy extended should supply the deficiency.

The eugenic laws of Huntington's chorea are well understood. Sympathy will have no trouble in becoming intelligent.

My advice to a person contemplating matrimony is: Do not marry a middle-aged person with trembling of the hands or head unless you know that his disorder is not Huntington's chorea. As the disease does not develop until middle life, do not marry any person either of whose parents had Huntington's chorea.

CHAPTER XXVI

Stammering and Stuttering

STUTTERING SCHOOL CHILDREN

It is a peculiar anachronism that imitation is responsible for some of the stuttering, and stutterers stutter most when they are afraid lest their stutter and their stuttering be noticed. But then, when you inquire into the subject further, it is not so odd.

Stutterers are above the average in intellectual activity and in mental brightness, but they are lacking in mental poise. The same lack of level mindedness makes them imitate stutterers, and, having become stutterers, makes them sensitive about it.

In cities stuttering children can be gathered into special classes with special instructors. In the country the stuttering child must be taught in the same class with other children. Is there anything that can be done?

To begin with, stutterers generally are of a nervous or even neurotic stock. In their family trees are found a large number of people not of good nerve poise. In the next place generally they have been badly brought up. As babies they were rocked to sleep or trotted when they cried. As children they were allowed too much excitement.

The statistics show that most children who stammer begin before school age. The child learns how to talk properly, but somewhere between two and seven years of age picks up the stuttering habit.

The teacher's problem is to take this child of a nervous stock with an acquired habit and to teach him correct speech methods in addition to the ordinary tasks of the schoolroom, and at the same time to prevent other children from contracting the habit.

The first step is to have a frank talk with the subject. The next is to have an equally frank talk with the students. The next is to discover the fault with that particular child, and the next is to outline a plan of speech training and mental training for that child.

The parents should equip the school library with Dresslar's "School Hygiene" and Scripture's "Stuttering and Lisping." The next step is to study the books and the next is to study the child.

Dresslar puts great stress upon studying the child as well as its defect and adapting the treatment to the case. In the cure of stuttering in the different stuttering schools the personality of the teacher is as much a factor as the method employed.

To the school child the two personalities who rank supreme are mother and teacher. No specialist will ever surpass them in personality as the child sees them.

A study of these books will give them enough technical skill. When to this their personalities and something of patient effort are added, a mother helping the teacher and the teacher helping a mother should make a combination capable of curing almost any stuttering child.

STAMMERING

Much the most comprehensive book on stammering that I know of is one recently written by Prof. C. S. Bluemel of the University of Colorado. Of stammering by young children he says:

"Much success has been achieved by a few stammering schools established especially for young children. We have already emphasized the fact that during childhood, when the secondary causes have not yet supervened, stammering usually yields readily to rational treatment. But it is not by any means necessary, and perhaps by no means desirable, that a young child be incarcerated in an institution. An intelligent mother can usually accomplish all that is possible for a stammering child if, instead of supinely waiting for him to 'outgrow' the difficulty, she will undertake to combat the impediment.

"In the first place the child himself must be induced to strive for fluency in speech. He must be offered a substantial and much coveted reward for ultimate victory, and must then be helped at every stage of the contest.

"He must be checked quietly and gently each time that he stammers. He must be made to wait and reflect upon the words he is about to use—and to utter these words slowly and with composure. If he then speaks fluently he should be commended and encouraged and should be made to repeat the words in order that he may gain assurance.

"The child should be made to feel that, although it is not reprehensible to stammer, it is nevertheless highly commendable to speak with fluency. He should never be laughed at, scolded, or punished for his impediment; for, with such treatment, fear soon associates itself with speech. He should never be mimicked, and for this reason and a hundred others should be kept from school till the impediment has been eliminated.

"If much amnesia appears to be present the child should be told to think, during speech, how his words are going to sound. If physical stammering is in evidence he should be taught to inhale before speaking and to speak at all times without effort.

"The child should be required, by way of practice, to learn and recite simple rhymes. He should be told little stories, and should be made to repeat each sentence slowly and carefully after the parent. Later, when progress has been attained, he should be required to relate these stories by himself.

"If mothers would adopt these simple measures we should in a few decades hear little more of stammering."

When Bluemel began to study stammering he wrote down certain facts. No theory as to the reason for stammering could be acceptable to his mind unless it explained all the facts. The facts to be explained were these:

"The true cause of casualty must explain all the facts. It must explain the fact:

"That the stammerer can usually sing without difficulty.

"That the stammerer can often speak well when alone.

"That the stammerer is usually fluent when speaking in concert with other people.

"That the stammerer can usually repeat fluently the words that are pronounced for him by another person by way of assistance.

"That the stammerer can usually repeat a word that he has eventually stammered out.

"That consonants at the end of a word never occasion difficulty.

"That the stammerer may have difficulty on words that commence with vowels.

"That the speech defect may assume the most diverse forms. being in one case passive and in another active and boisterous.

"That one can stammer in thought as well as in speech.

"That there are more male than female stammerers.

"That stammering is rarely acquired after the fifteenth year."

Starting out with an explanation of these facts as his task, he arrived at the conclusion that the trouble was with the mental processes of the stammerer, and that treatment to be lasting must be directed toward the mind.

Stammerers differ. There are lispers, stutterers, and other types of stammerers. In some the physical side of the impediment is prominent. Various habits of tongue, lips, facial muscles, and even of the body as a whole may be superimposed on the speech habit in time. The stammerer may have been started off with a speech defect in which physical factors are prominent.

Various modifications of habits, of thought, of demeanor, of temperament, develop as a result of speech defects. Therefore, when the cure of a stammerer is undertaken there should be careful study of the individual to determine his type and also his peculiarities, his physical, mental, and social makeup.

The simplest, easiest of all propositions is the cure of stammering in young children. As indicated above, the problem then is so simple that it can be left to intelligent mothers. A little knowledge combined with love, kindness, tact, and patience is all that is required.

In fact, without any education except the haphazard education of life, about three-fourths of the stammering children are cured of their infirmity. Somehow or other they stop. Bluemel thinks that patient, careful, intelligent mothers could cure nearly all of the remaining fourth.

Next easiest of cure are the physical additions present in certain stammerers. The mind having failed to work properly before, the stammerer expects it to work improperly this time. He tries to overcome his defect by unusual motions with his lips and tongue, thus producing strange sounds, or he hesitates and then explodes out a jumble of sound, or he changes his facial expression, or jerks his head, or neck, or arm.

The schools that teach by singing methods, elocutionary methods, most any sort of method, are highly successful in relieving this annoying phase of stammering. When relieved of this element most people think themselves cured.

When it comes to pure stammering, the opinion of Bluemel is that there must be a careful analysis of the mental processes of the stammerer and a carefully planned system of mental training founded on it. Training mental

processes cannot be done in a day. The analysis must be done by the stammerer and a trained man of learning, working together. The plan must be laid out by the man of science. The carrying out of the plan must be done by the stammerer himself, with occasional supervision by his mentor.

Bluemel says that, when the quacks are eliminated, there will remain two classes of persons treating stammerers—"the good hearted and well meaning souls that know nothing about the malady and the ingenuous and more intelligent students of stammering as a deep and intricate psychological problem. Men of the latter class are almost exclusively physicians, and the best of them undoubtedly are found in the German empire."

Bluemel began his study by a careful analysis of the speech of the stammerer. First he determined which sounds were difficult. Then he analyzed the physical effort made by the breathing apparatus, the larynx, the tongue, and the lips in producing each of these sounds. Next he analyzed the mental and nervous factors responsible for speech; and next, the relation of these to the words and sentences which serve as impediments in stammerers.

Next he analyzed the social factors which have any relation to stammering, such as the age and sex of stammerers, station in life, the effects of association, school, in social intercourse, the effect of ridicule, of the various emotions, of imitation, of embarrassment, timidity, fear, anger.

With the results of these analyses of stammerers and stammering before him, he began a study of the world's literature on the subject. In this study he reviewed what had been written on stammering, stuttering, and speech defects, and in addition whatever in literature, psychology, sociology, medicine, and natural science was calculated to throw light on the subject.

Having laid the foundation, he studied every important method of treating speech defects in use in Europe and America. The results of these studies are told in the two volumes.

It is unfortunate that the scientific study to be found in Volume I is, probably of necessity, so technical that the stammerer will not be able to understand it, unless he makes constant use of the glossary, and even then it will be difficult.

In Volume I Bluemel is the analytical scientist—calm, philosophical, unimpassioned, unemotional. In Volume II, a different Bluemel comes to bat. He still is analytical, learned, well informed, and keen, but now these qualities are made to serve the purpose of a crusader, a satirist, an honest man scourging the thieves and money changers from the temple.

He takes up the schools and methods of cure, group by group. First, he analyzes the method to show the underlying principles made use of. He found that the hundreds of methods fell into a few groups.

He then investigated the history of the subject. He found that in methods for the cure of stammering there is nothing new under the sun. Some part of it goes back a thousand years. Much of it originated with Erasmus Darwin, the grandfather of Charles Darwin, and every important detail was in use at least one hundred years ago. Systems advertised as having been revealed by God he proves to have been stolen outright.

Finally he dissects the business methods of the stammering schools, showing them to be as bad as the advertising doctors in their palmy days.

He investigated carefully and found that the schools cured about five per

cent. of their pupils. There is nothing remarkable in this. Seventy-five per cent. of the children who stammer get well without treatment. Of course, stammering schools do not get many of this group. The percentage of cures without treatment among those of the age and station who patronize these schools is almost as great as among the students.

What the best of the schools do is to cure the physical additions which develop in stammerers. This helps, but it does not constitute a cure.

Speaking generally of the systems, he says: "Many of them are entirely devoid of merit; they have been recorded (in this study) merely because they are the gold bricks that are daily sold to stammerers by an infamous fraternity of 'speech specialists.' . . . Progress is hampered by the charlatans who rob the stammerer and bring everybody and everything connected with the treatment or investigation of stammering into disrepute."

"The great secret" guarded by speech specialists is the fact that the stammerer is being bunkoed.

"The charges are exorbitant; but these frock-coated frauds operate chiefly among the 'superior' classes. Of recent years a few cheaper schools have come into existence. They are apparently no worse than the 'superior' institutions."

"The writer has never known of a worthless institution that was not recommended by a body of bishops, colonels, mayors, postmasters, doctors, and men that are usually credited with intelligence. The clergy are inveterate recommenders. In America recommendations from mayors, former mayors, and merchants often are obtained through commercial associations, boosters' clubs, and organizations for mutual support among rotten concerns that cannot exist on merit.

"Newspaper puffs in the local press (when not paid for) are usually inserted in the interests of 'a greater Mudville.'

"When the man in the picture points his finger at you and says, 'I guarantee to cure stammering,' he is lying."

"The writer has an acquaintance that has taken eight courses at English stammering schools. He still seems good for eight or a dozen more."

"The writer could name four principals (of stammering schools) who have themselves relapsed. Correspondence schools are few and sporadic. They probably do very little good and very little harm; they need not be taken seriously."

Stammering.—*B. D. B. writes: "1. What causes stammering and stuttering? 2. Can it be cured? 3. How?"*

REPLY.—1. Stammering and stuttering are the same. The cause may be one of several.

2. Yes. The case will depend on the type, the cause, the age of the subject, and the duration of the condition.

3. The method will depend on much the same factors as are set forth in answer 2. In some children a single lesson suffices. In other cases years are required for cure. When a person has been born with an unstable, nervous system, has acquired a wrong speech method, and where this method has been persisted in for years, it is reasonable to expect that much time will be required to retrain the individual. Sometimes it is only the speech method that requires attention; sometimes mental methods must

also be changed. My advice is that you get "Stuttering and Lisping," by Scripture [Macmillan], that you study it with the most caretaking, patient physician in your town; that, in the light of what you learn from the book you study your child, and then follow the plan devised by you as a result of this study.

Stammering a Nervous Condition.—*B. Y. writes: "I am 27 and I stammer. Sometimes I talk almost like the best speaker and all at once I cannot get one word out, or stammer so badly that nobody can understand me. I am perfectly healthy and don't think I am nervous at all. I have stammered since I was a little girl."*

REPLY.—Stammering is purely a nervous condition. There is nothing wrong except in the mind. While most stammerers are neurasthenics, some are not. The remedy is by psychotherapy.

The different systems of cure are about equally good. Whenever the patient has faith that the system is going to cure, the cure is half accomplished. After that it just means patience and grit.

Generally stammerers do not try for a cure until the habit has been on them for years. A ten year habit cannot be cured in ten days. Go to any one of the schools, pick the one where the teacher makes the best impression on you, have faith and stick.

To Prevent Stuttering.—*N. V. writes: "I have a little girl about 3 years of age. She is perfectly healthy and bright. She has been talking as plainly as any child, but lately, say for the last month, I notice an inclination to stutter at the beginning of a sentence. Kindly advise me what to do."*

REPLY.—Admonish her to speak slowly.

Children are prone to imitate. Speak slowly and deliberately when in her presence. Do everything you can to cultivate poise in her. Keep her away from everyone with a speech defect or a bad speech habit.

Cure Matter of Training.—*La Grange writes: "There is a boy of my acquaintance, 14 years old, who is afflicted with stammering. What can be done in his case? Should he have medical treatment, or is there some kind of a school or institution where he can be sent to be cured of his trouble?"*

REPLY.—The Chicago public schools have a school for children with speech defects. There are private schools, each teaching some one method. Scripture, in his book on "Stuttering and Lisping," says the trouble with these institutions is that the fundamental trouble differs in nearly every case, and, therefore, the method must be changed for each case, or nearly so. Medical treatment gains nothing. Cure is a matter of training.

How to Cure Stuttering.—*A. W. writes: "Will you please let me know whether stuttering or stammering is curable, and whether a surgical operation is necessary? I have stammered and stuttered badly for some time. Now I at times find it difficult only to commence certain words. Sometimes I can speak almost without any difficulty. What would you advise in my case?"*

REPLY.—I cannot see how a surgical operation would help you. Stuttering is curable. A careful study of the individual case and persistence in carrying out the cure bring success. Read Scripture on "Stuttering and

Lisping," decide on a method, and patiently follow the method you have selected.

May Help Yourself.—*F. C. P. writes: "I am 14 and I stammer. I have attended schools of stammering and have tried nearly everything. Nothing seems to help. Would you please give me some advice?"*

REPLY.—No two stammerers can be treated exactly alike. Go to your nearest library and get Scripture's "Stuttering and Lisping." Read it carefully. Through it you may be able to help yourself.

Suggestion for Stammerers.—*J. A. E. writes: "I wish to state that a number of years ago I stuttered on every word. I started to whistle as I started to talk, and found I had no trouble talking. If you will watch the faces of the majority of stutterers when they talk you will see that they breathe in instead of breathing out. If they will only stop and whistle they will be able to talk without stuttering. I stutter little at the present time. I have been to stutterers' schools, but found the whistling helped me more than any other treatment."*

Child Stammers.—*A teacher writes: "Will you kindly advise how to control stammering in a child of 5?"*

REPLY.—I would suggest that you get Scripture's "Stammering and Lisping." It is a small and inexpensive book. There are many cures for stammering. Scripture writes that each subject must be carefully studied and then a plan outlined for that individual. Each cure is adapted to a group of cases, but ineffective for others. Whatever the cure, it is a matter of training and patient persistence is essential.

PHRENOLOGY

Not long ago I picked up a daily paper published in a city of some importance. I was astonished to read of a combination for mutual advantage between this newspaper and an archaic type of faker—a phrenologist. The "professor" was writing daily character studies of prominent people, based on bumps, for the newspaper. The newspaper was running editorials and editorial notes about the "professor" and his bumpology, and everybody was happy except the poor "suckers" who were being done out of their coin by the Bump and Hump twins.

The quality of brain, to say nothing of the brain capacity, is in no way related to the bumps on the head. The soft, brainy substance cannot push knobs on the hard, bony skull, and, for that matter, the hard, bony skull cannot change the type of brain inclosed therein.

No group of scientists, psychologists, anatomists, histologists, or physiologists has ever been able to find any evidence of relation between skull humps and bumps and types of mind or mental capacity. This information is more or less generally diffused, and yet these fakers still catch fair crops of suckers.

Don't waste your time watching for bumps, hoping thereby to estimate character. If you have time to spare, however, put in some of it watching children for mouth breathers and thumb suckers. Sometimes it will prove as interesting as reading a "best seller."

HEAD NOISES

One of the most frequent calls for help coming to me is the call for relief from head noises. Searching far and near, I have not been able to find a suggestion simple of application and offering hope of relief for many sufferers, and these are the reasons:

The ear is divided into three parts—the external ear, the middle ear and the internal ear. The external ear opens to the outside and, at its inner end, is closed by the drum. The middle ear opens into the throat, and, at its outer end, is closed by the same drum. Then the purpose of the external and middle ear is to receive the sound waves and convert them from air waves into bone waves. The internal ear converts these bone waves into nerve impulses which the brain interprets as sounds.

Incidentally, a part of the internal ear keeps the body in proper equilibrium. The simple way to put the last point is to say that, when that part of the internal ear is disturbed there is vertigo, swimming in the head, and sometimes fainting.

When one is hit in the eye or so as to jar the eye, one sees stars; when the bronchial tubes are irritated, there is cough. When the nerves of the internal ear are irritated, the irritation expresses itself not by stars, or cough, or sense of heat or cold, or pain, but by "noise."

In the case of head noise the external ear should be examined. Wax may be irritating the drum. If so, and it is cleaned out and the canal is kept clean, the trouble will end in this group of cases.

Occasionally the ears are too keen. In this case, cotton in the ears will bring relief. In some cases the throat man will find that adenoids or tonsils are interfering with the canal from the nose to the ears.

These are the unusual causes of head noise. The usual cause is trouble in the internal ear or the bones that surround it. Any inflammation or disease of any sort in the internal ear such as would cause pain in another part of the body causes head noise.

Head noise merely means that the internal ear is being pained and is responding to the irritation in the only way known to it. Doctors try to find out something more about the trouble by inquiring into the nature of the sound. For instance, some say that a sharp, metallic, striking sound like that of a hammer striking an anvil is due to disease in the bones.

Furthermore, they try to sound conduction of the bones. Bones get denser and under other circumstances more porus, and the ear test is a fair test for bone density.

One with head noise due to internal ear disease can do something by keeping his bowels right and living a hygienic life. Ear specialists can cure some of the cases. But the average man with head noises must make up his mind patiently to endure, to calm himself, to train himself to forget the noise.

Nor is this as difficult as we imagine. A street noise must be out of the ordinary to attract attention. We forget, or never hear, or, better, never notice—nine-tenths of the sounds we hear. We have so trained ourselves. We could easily hear our hearts if we encouraged ourselves to listen for them.

CHAPTER XXVII

Headaches

The most helpful statement about headaches that I can make is that one should not take coal tar headache cures. They are effective in just two varieties of headaches. They give relief in bilious headaches—headaches due to overeating or improper eating, and headaches due to constipation. But for this variety of headache there is a better remedy. A full dose of purgative taken on an empty stomach will act more quickly and better.

The source of poisoning having been removed, a short period of mental rest will restore mental balance. The disadvantage of using headache powders in this group of headaches is twofold. It begets the headache habit. Coal tar headache remedies change the blood so as to produce headache. By frequently taking headache medicine one can easily double the number of his headaches in a month.

The second disadvantage is that the use of coal tar headache remedies makes one forget that the essential thing to do is to eat less, exercise more, and attend to his elimination.

The other group of headaches relieved by coal tar remedies are those due to fever, sore throat, and infections generally. It is not safe to allow headache from that source to run long without medical attention. The danger is that the infection may be with an organism capable of doing great harm. Certain quite serious disorders begin with headache.

Another reason why headache powders should not be used habitually is that the habit leads people to overlook important causes. Bright's disease and arteriosclerosis are grave but subtle conditions. It is important to know of them early; yet when they knock at our doors they do not bang. There is no brass hammer business. They tap very, very gently, and, half awake, we dream the sound to be of another nature, or we miss it entirely.

A persistent or frequently recurring headache may be the form taken by the gentle tapping. Anything which makes us overlook the cause of the tapping may harm us.

The habit may cause us to overlook the condition of the eyes. Of all the causes of headache, eye strain is said to be the most frequent. I do not think so. I think that if we could get a headache census we should find that biliousness-overeating-constipation was the most frequent cause. Nevertheless eye strain is a very important cause of headache. People who dismiss their headaches from consideration by swallowing a tablet or a powder are liable to suffer their neglect of their eyes to continue.

There are other causes which may be overlooked when the custom is to take one or more doses of headache medicine and to let it go at that. That the pain does not get better after the medicine has been taken makes no great difference.

The two thoughts which should stand out are these: When one has the headache habit he should know the reason why; and the use of headache medicine does harm in several ways, among others by multiplying the spells.

FOUR KINDS OF HEADACHES

Any sensation of any sort anywhere inside or outside the skull or within a few inches of the skull is liable to be called a headache. Worse still, not content to throw all disagreeable sensations of the head into one bag labeled headache, we have one remedy for headache—a coal tar headache cure. And worse still, though this remedy may give temporary ease, it causes more headaches than it cures. Though this coal tar cure be called anti-this or anti-that, or by one or another copyrighted name, essentially the medicine is the same.

There are a dozen kinds of headaches, and what is proper for one is not proper for another. Then where is the sense in having one headache remedy for everybody that has headache and for every kind of a headache?

In an annual address before the Iowa Medical Society Dr. Patrick told his audience of some things that he had observed about four kinds of headaches.

If a headache be due to rheumatism, it is necessary, first, that it be recognized as such. The cause of rheumatism is pus infection from some source of infection. As in all other forms of rheumatism, the source of infection must be found and remedied. For relief, nothing is better than massage, heat locally, and aspirin internally.

The second form of headache discussed by Dr. Patrick was that from sinus trouble. The pain from sinus headache is not especially liable to be located near the sinus. In cases of sinus headache there is very apt to be a little fever—a half a degree or so at some time during the day. A good nose specialist can locate sinus trouble, and a blood examination shows some increase in the white cells during the spell.

Sinus headache is helped by steaming the nose or soaking the face in hot water. When the offending sinus is cleaned out, the headache gets well.

The third variety discussed is the neurasthenic headache. The headache of neurasthenia is not a pain; it is an unpleasant feeling of pressure. This sensation is liable to be geometric—a band, a circle, a point, a streak, a square, or a parallelogram. When the pain is described in this way or emotion is a factor, Dr. Patrick told the physicians that the headache is neurasthenic and must be treated on that basis.

Much the most important of the four varieties of headache discussed was migraine. This form of headache runs in families. It attacks women more often than it does men. It begins in childhood, increases in frequency and severity until the age of forty-five or fifty, and then lessens.

Migraine headaches go by a dozen names—sick headache, constipation headache, menstruation headache, neuralgic headache, nervous headache, gouty headache—all forms of migraine.

The prime necessity of treatment is to search out and remove every custom which can be classed as wrong living; to change the eating habits, especially

if there is a tendency to overeat; to exercise vigorously in the open air; to correct constipation; to search out and remove all sources of ill health such as "pelvic pathology and pressure from a deflected septum, enteroptosis and eye strain, constipation and overwork, excessive menstruation and loss of sleep, excess of alcohol or tobacco, insufficient food, anemia and domestic discord."

While proper attention to such of the above as may need attention in a given case may not entirely prevent attacks of migraine, the attacks will be less frequent and lighter. It is just in these headaches that coal tar headache powders and tablets are most used. The great objection to their use is that they increase the frequency of the headaches.

HEADACHE PREVENTION METHOD

In many people great activity in the large intestine, particularly in the colon above the rectum, is accompanied by irritation of the nose. To be more specific, for a short time preceding a copious bowel movement, particularly if there is some griping and pain, sneezing will be frequent, and the nose will discharge water freely.

This is especially noted, as stated above, when there is considerable abdominal discomfort. It has been suggested that a pinch of snuff or a whiff of ammonia be used as a laxative in lieu of salts and oil by the stomach.

It has been noted that women who suffer from painful menstruation and monthly headaches are benefited and ofttimes cured by burning the nose.

Separating the nostrils from each other is a partition called the septum. On the outer wall of each nostril are three bony ridges called the turbinate bones. It has been found that there is a nerve connection between the uterus, the breast, the brain, and the nose.

At the time of menstruation physicians have noted a swelling of the membrane over this septum and over the lowest one of these ridges, called the inferior turbinate.

They have gone farther than that. They have prevented monthly headaches and painful menstruation by burning these areas two or three times during the month with trichloracetic acid.

In the *Journal of the American Medical Association* there is a report of 93 cases, and in *Surgery, Gynecology, and Obstetrics* there is a further report of cases treated in this way. Most of the reports on the subject come from Germany.

An able German authority, Edinger, says that the most frequent form of headache is one where there is tenderness at certain points on the scalp. An important part of this theory is that massage of the scalp over the tender points relieves this pain.

The areas of soreness are as follows: An area one inch square one inch above the inner end of the eyebrow; an area one-half an inch wide and beginning one inch above the outer end of the eyebrow and running to a point one inch above and just behind the ear; the top of the head directly above the ears; the back of the head directly behind the ears, beginning two inches back, where the back of the neck joins the back of the head; along

the sides of the backbone in the neck; along the spines of the backbone in the neck.

HEADACHE MEDICINES

The powders, tablets, and capsules so frequently taken for headache induce drug habits. He who takes them is a drug fiend. He may not relish the association, but he belongs with the "coke" fiend, the morphin "dope" and the whisky "soak."

When, in the '80's, this group of remedies began to appear, the medical profession quickly saw their usefulness in relieving aches and pains. Before many years it was seen that they led to habits, whereupon the medical profession became much more careful in using them.

However, in the meanwhile the people had learned by experience that they would relieve headaches and the aches of colds and fevers. In consequence the use of them at least holds its own, and possibly increases.

Occasionally a large dose of "headache" medicine kills suddenly by overwhelming vital nerve centers, but these cases are so infrequent as not to be the principal reason for not using the drugs.

The main reason for not using them is that they harm the blood cells in such a way that they cannot properly carry oxygen to the cells of the body, nor can they carry away body wastes—just as if a man were marooned in a house with the grocery wagon only able to get to him twice a week, and the garbage wagon twice a month.

The result is that his tissues are poisoned and starved—but more poisoned than starved. He gets flabby and soft—suboxidized—physically and mentally. Instead of a headache once a month he now has one a week. Instead of being cured by a small dose of "headache" medicine, he now needs a large dose.

The more he takes the more "stippled" are his red blood cells, the more his nerve cells cry out in pain.

This is the kind of habit and the reason for the habit known as the headache medicine habit. It differs in many ways from the "coke" or "dope" habit. It is a habit which affects the individual solely. It has no social relations.

The alcohol fiend may shoot up the town, and the morphin fiend may steal to get his drug. The headache medicine fiend has no disposition to bother anybody.

A man is frequently justified in taking a dose of such medicine for the relief of a headache, but the circumstances must be exceptional. Whenever they become regular the man had better by far go after the underlying cause, or rely on purges, or bear his suffering, or all combined.

He must fight it out some time, and he had better fight it out while the water is shallow. To take headache medicine and let it go at that is constantly drifting him toward water over his head.

Sick Headache.—*W. A. B. writes: "What is the cause of chronic sick headache? I have an attack of sick headache on an average of once a week, at which times I suffer excruciating pain through the eyes, temples, and back of the head and neck. These attacks are accompanied by violent*

vomiting and usually last from five to eight hours. They are sometimes brought on by an extra effort in the way of physical exercise or manual labor and I have suffered with the ailment since childhood."

REPLY.—Such headaches, termed migraine, are closely related to gout. To eat less and exercise in the open air more increases the interval between them. They are many times more abundant among inside people than among out of doors workers. A good cleaning out brings relief. An attack comes when clogging has recurred. With these facts in mind knowing what to do is easy. Doing it is hard. One of the advantages of old age is that gouty headaches have quit. Somewhere about fifty they seem to say to themselves: "I cannot teach this fellow to live in the open and eat less. I think I shall quit trying." Whereupon the man becomes less and less subject to sick headache.

Cause of Sick Headache.—*M. S. M. writes: "What causes sick headache and what is the best remedy?"*

REPLY.—Sick headache is due to:

1. Nerve tire.
2. Condition of poisoning from chemical substances manufactured by the body or manufactured in the body.
3. Eye strain.

Some cases are due to one of these alone. Most of them are due to several combined.

Remedy:

For those cases due to nerve tire—rest.

For those due to eye strain—eye rest, including proper glasses.

For those due to what is called intoxications, gout, biliousness, and the like—a laxative and, sometimes, some of the coal tar headache medicines. It has been demonstrated that the promiscuous use of these increases the frequency of gouty headaches, though they give temporary relief.

Headaches from Stomach.—*J. C. F. writes: "I am 50, and at 30 got my first headache. Headaches come once or twice every month. I took great care of my stomach and for years warded off the headaches. Five years ago I got it daily. My sight is good, my meals regular, also my sleep. What course should I adopt?"*

REPLY.—The important causes of headaches are:

1. Eye strain.
2. Migraine.
3. Mental strain.

If your eyes have been competently examined, your case is limited to one of two groups of causes, in all probability. You may be working your brain or worrying too much. In that event you should have more mental rest. Probably you have migraine. If so, as you get older your headaches will get less.

Have your eyes examined again. Cut down the quantity of your eating; fletcherize; double your physical exercise; do less brain work. This is as much as I can suggest.

Migraine.—*K. C. H. writes: "What is migraine and how can it be cured? Is it not a new disease and is it not on the increase?"*

REPLY.—Migraine is a gouty headache. Inheritance is a large factor. It runs in families. After forty attacks come with less frequency and

they usually stop soon after fifty. Attacks can be relieved by purges, and mental and physical rest. Headache medicine gives some relief, but the average woman is better off without it, particularly if she has to "lie up" with it. It is not a new disease; people have always suffered with it.

Suffers from Migraine.—*J. T. N. writes: "What is the cause of sick headache? I have an attack of sick headache about twice a month. I have pain through the eyes, temples, and back of the head and neck. These attacks are accompanied by violent vomiting. What are the symptoms of gouty headache? Will inflammatory rheumatism cause headaches?"*

Reply.—You have what is commonly known as migraine. By keeping your bowels regular, eating lightly, exercising in the open air, and avoiding worry, you will reduce your spells somewhat. You will get some relief during spells from purges. However, migraine gets to be a habit. It usually lasts until past middle life, getting better as age comes on. It runs in families.

Treatment for Migraine.—*D. W. writes: "What is migraine? How can it be cured or relieved?"*

Reply.—Migraine is the name given to sick headache. It is one of the features of what is sometimes called biliousness. Commonly, there is a period of heavy logishness out of which a headache gradually develops. The headache may be attended by nausea and dizziness. Following it the mind is bright. It is something like the air after a storm.

A migraine tendency is inherited. The periodical attacks generally stop coming after the sufferer has reached fifty.

To give relief nothing equals purgatives, particularly salines, rest in bed, and, in some cases, headache remedies. To prevent attacks the free use of water, temperance in eating, and a simple life in the open air constitute about all that can be done.

Not a Headache Preventive.—*N. L. writes: "Will the juice of a whole lemon and one-half a spoonful of table salt in a glass of hot or cold water ward off a headache if drunk before breakfast?"*

Reply.—No. The salt will act as a mild saline laxative. There is the same objection to it that there is to any other saline laxative as a daily dose. A lemon, lime, or orange each morning is almost a necessity until the spring fruits and vegetables come in.

Has Harmful Effect.—*M. B. writes: "Will you please tell me what effect a continued use of a coal tar product for headaches, etc., will have on the heart if it is used in small quantities?"*

Reply.—Such use is moderately harmful to the heart. It is much more harmful in that it produces changes in the blood. Among other effects produced by these blood changes are headaches. Headache medicines, long continued, produce headaches.

Forbidden by Law.—*Inquirer writes that a headache remedy is being distributed on premises and sometimes is placed in mail boxes. Is the remedy liable to do harm? Is it against the law to distribute medicine in this way?*

Reply.—Headache remedies are generally composed of coal tar derivatives. They are moderately poisonous. A full dose for a grown person is a highly poisonous dose for a small child.

The *Legal Friend of the People* in the *Tribune* informs us that to distribute such medicine is against the law in Chicago. The fine is from $5 to $50. The ordinance violated is found in Ch. 22, Art. IV, No. 811.

Where many mail boxes are found supplied with original packages, there is a fair chance that the courts would hold that the company is responsible, even if the distributor was not apprehended.

Dizziness.—*J. B. writes: "What is it that causes one to become dizzy directly after taking the first mouthful of food at dinner, the dizziness disappearing at the second or third mouthful?"*

Reply.—Dizziness always calls for investigation and change in one's habits somewhere. There are many causes of dizziness, but no one who gets dizzy frequently is normal. Find out, as the result of proper tests and examinations by your physician, why you are dizzy frequently, and change whatever it is necessary for you to change, since to allow frequent dizziness to continue is unwise. The relation to the first mouthful of food as compared with other mouthfuls is of no consequence.

Paraffin and Headache.—*A. R. C. writes: "Can you explain the use of paraffin oil? Also the benefits derived from it? Is there any danger if it is bought from a reliable druggist? Would you advise the use of it for headache? What is self-infection, and its cure? Is it similar to auto-intoxication?"*

Reply.—1. Paraffin oil is not absorbed from the intestines. The theory is that it acts as a lubricant. In crude oil there are substances which absorb, and some cases of harm have been reported.

2. So much depends on who is using the word reliable. So much has been written on the subject of pure and impure paraffin oil that every druggist has had it brought to his attention. The high grade ones should have gone to some trouble to get a properly refined article. Buy from the most dependable known to you.

3. If the headache were due to constipation, yes.

4. I do not know just what you mean by self-infection. I presume auto-intoxication is synonymous. However, the answer would depend upon the connection in which the term was used.

Too Much Aspirin Harmful.—*J. R. S. writes: "A friend of mine uses aspirin tablets. At first she used them for headaches; now she uses them whenever she thinks she is going to have one. I have known her to take a dozen in one day. The question is: Aren't they dangerous when one takes as many as that? Does not a person acquire a 'taste' for them the same as one would morphin? Doesn't the constant use of them endanger health?"*

Reply.—Aspirin as a habit producer is not in the class with morphin; but you can be certain that anybody who takes a dozen aspirin tablets a day is being harmed by them. Anybody who takes any headache medicine systematically and regularly is being harmed by it.

CHAPTER XXVIII

Foods

Foods are divided into two classes—organic and inorganic. Organic foods are divided into proteids, fats, and carbohydrates. Proteids are the tissue formers and are found in both animal and vegetable food substances. Fats are the heat producers and are also found in the animal and vegetable foods. Carbohydrates are the energy or work producers and are almost entirely obtained from the vegetable world.

The common forms of the first class—the proteids—are lean meat, eggs, milk, cheese, peas, beans, and cereals; of the second class—the fats—butter, fat meat, bacon, lard, olive oil, cream, chocolate, and certain nuts; of the third class—the carbohydrates—potatoes, rice, cornstarch, arrowroot, many grains like wheat and oats, the sugars (cane, beet, and milk), maple syrup, molasses, honey.

The main inorganic foods are water and common salt.

It is a common belief, borne out by results of a large amount of experimental investigation, that Americans use more food than people of Europe of the same class. The dietary of the working people of America contains more meat than that of the toilers of European and Asiatic countries.

The reason is that meat is more expensive in those lands than in America. Fats occur in smaller, and carbohydrates in larger, quantities in European dietaries than in American.

Cold storage has changed the dietary habits in some parts of this country. Formerly, in the north, people were limited to cabbage, potatoes, onions and a few other root crops in the winter and to eggs and salt meats during the summer.

Circumstances determine the food of an individual or family to a great extent. Statistics show that we Americans are on the whole overfed rather than underfed.

Langworthy says: "Animal and vegetable foods are about equal as sources of protein, some 48 per cent. of the total being supplied by animal foods and some 52 per cent. by vegetable foods, of which 43 per cent. is contributed by the cereals. Little fat is furnished by vegetable foods, the group as a whole supplying only 11 per cent. of the total amount in the diet.

"Animal foods and dairy products are the most important sources of fat, milk and cream furnishing 26 per cent. of the total fat of the diet and meat as a whole furnishing a little over twice as much as is supplied by all other animal foods. Of the different meats, pork is the most important source of fat.

"Meats and poultry together furnish about twice as much protein as the other animal foods, and of the different meats, beef and veal together furnish about half of the total amount supplied by the entire group."

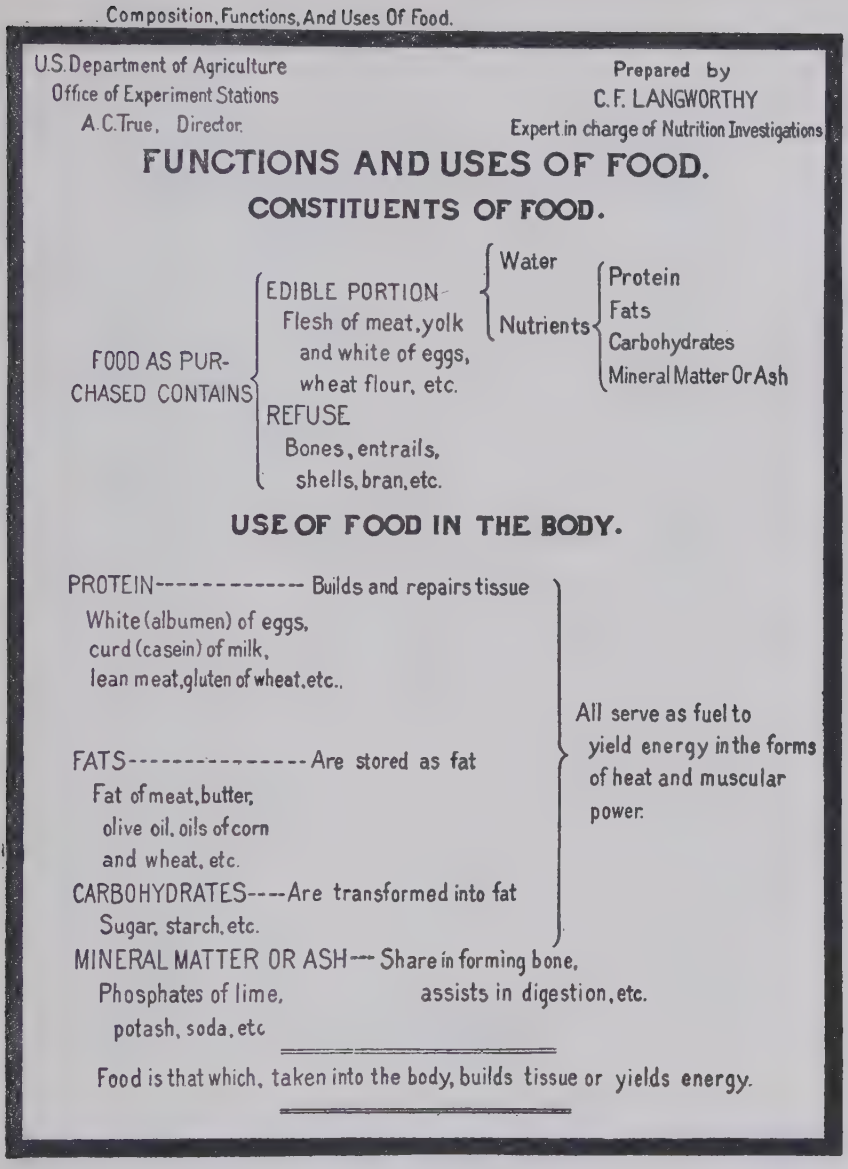

Composition, Functions, And Uses Of Food.
U.S. Department of Agriculture
Office of Experiment Stations
A. C. True, Director.
Prepared by
C. F. LANGWORTHY
Expert in charge of Nutrition Investigations
FUNCTIONS AND USES OF FOOD.
CONSTITUENTS OF FOOD.
FOOD AS PURCHASED CONTAINS
EDIBLE PORTION
Flesh of meat, yolk and white of eggs, wheat flour, etc.
Water
Nutrients
Protein
Fats
Carbohydrates
Mineral Matter Or Ash
REFUSE
Bones, entrails, shells, bran, etc.
USE OF FOOD IN THE BODY.
PROTEIN---------- Builds and repairs tissue
White (albumen) of eggs, curd (casein) of milk, lean meat, gluten of wheat, etc.,
FATS---------- Are stored as fat
Fat of meat, butter, olive oil, oils of corn and wheat, etc.
CARBOHYDRATES---- Are transformed into fat
Sugar, starch, etc.
All serve as fuel to yield energy in the forms of heat and muscular power.
MINERAL MATTER OR ASH--- Share in forming bone,
Phosphates of lime, potash, soda, etc
assists in digestion, etc.
Food is that which, taken into the body, builds tissue or yields energy.

FIG. 163.

BREAD

That bread is "the staff of life" is an old saying hardly subject to contradiction. Everybody eats bread. It is more abundantly used than any other article of food.

Bread is made of flour ground either from wheat, buckwheat, barley, rye,

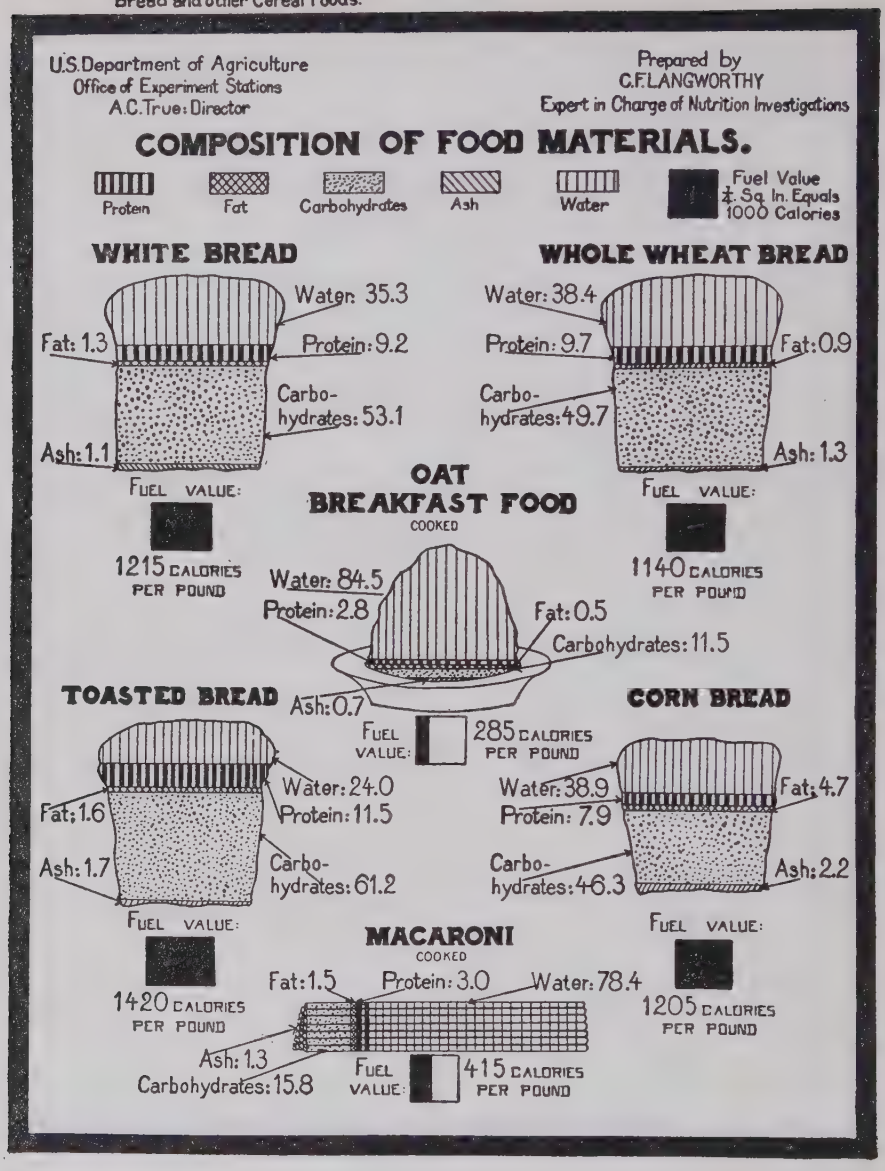


FIG. 164.

or corn. Enough water is added to the flour to make a uniform dough, after which it is kneaded, either by hand or machinery. A pound of bread is composed of three-quarters of a pound of flour and one-quarter of a pound of water. To this is added enough yeast to excite a fermentative process.

As a result of the fermentative process starch is converted into alcohol, carbonic acid, and water. Just enough salt is added to the bread to give it a pleasant, wholesome taste.

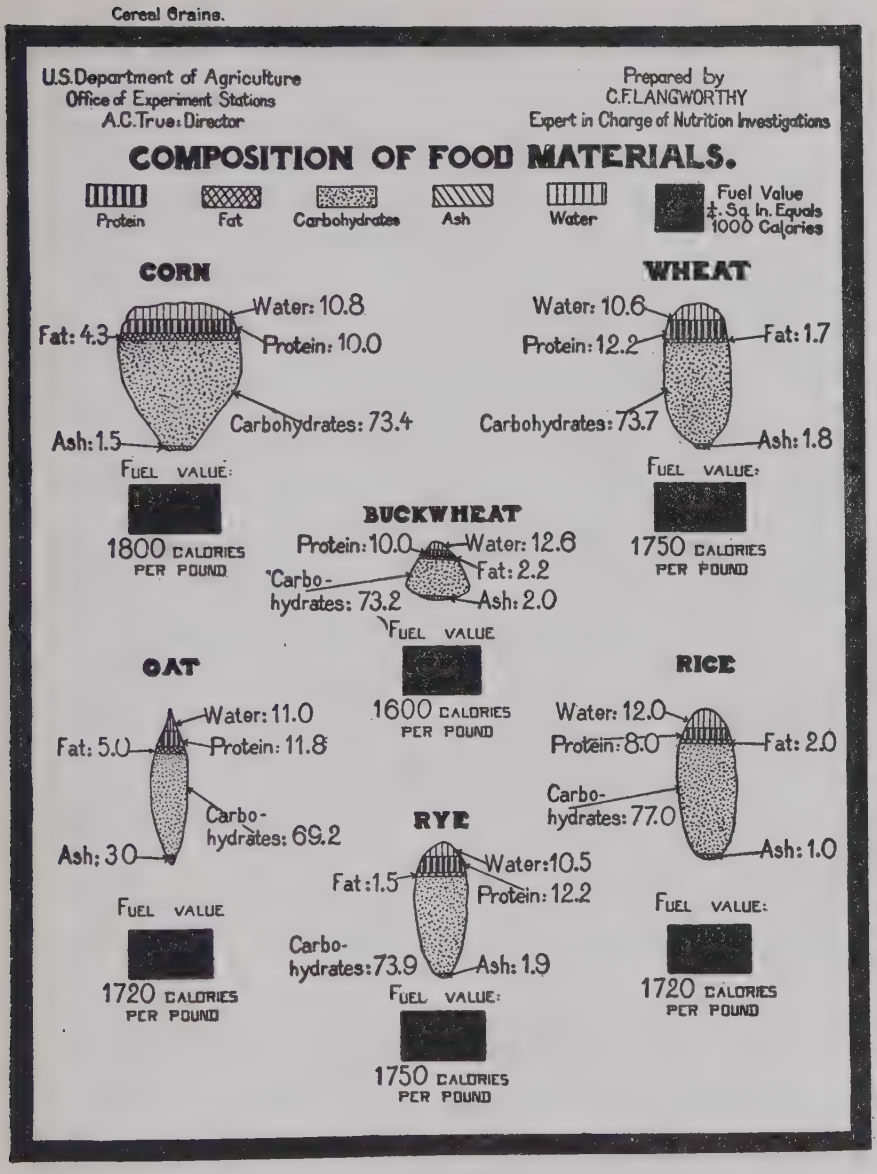


FIG. 165.

The object of baking is to kill the yeast germ and arrest fermentation. The art of baking bread is all important, since it has much to do with whether the bread is heavy or soggy and whether it is sour. When the baking process leaves the bread in this state it has not been scientifically done, as the germ of fermentation is still active.

Where bread is made from wheat flour it is usually referred to as white, gluten, graham, whole wheat, and bran bread, the name being derived from the particular kind of flour from which the bread is made.

Of these, the white is higher in nutritive value, but it may not be so wholesome, as it is less bulky, contains less roughening, and hence is more constipating.

Graham and whole wheat breads are supposed to be made from flour which contains all of the constituents of the original grain in their same proportions. In many cases, however, the graham and whole wheat flours have been but partially bolted.

Bread is a mixed food, containing many classes of ingredients—fat, salts, sugar, protein, and starch. While it contains fat, it does not contain enough to make it a perfect food, which probably explains in part the reason why people eat butter with their bread.

Bread does not seem to tire the appetite. No better explanation, perhaps, could be given for its common consumption than this fact.

The free use of hot bread is usually tabooed by hygienists for several reasons. Hot rolls, for instance, are not thoroughly chewed before swallowing, and are, therefore, not properly mixed with the digestive juices. There may be too great a quantity eaten, because of greater palatability. Accordingly, the habit of eating stale bread instead of fresh should be encouraged.

White bread usually is purer than the brown breads, because it is easier to adulterate the brown breads than the white. White bread, however, may be adulterated with chalk, gypsum, pipe clay, and similar articles.

The addition of a mineral acid to bread containing these adulterants produces an effervescence when it comes in contact with the carbonates used as such adulterants.

A man cannot keep in condition on a diet of bread alone. At the same time he would come nearer succeeding than on a diet of only meat, olive oil, milk or any other food article. It comes nearer meeting all the requirements than any of them. Some have the idea that milk is a complete diet. It is for a baby under six months of age, but after that, no. On the other hand, every race and, for that matter, every individual, builds the menu around bread.

Bread is out of balance in that the percentage of starch is too high. Protein, fats and salts are too low. There is not enough roughage to prevent constipation. Bread which contains a high percentage of bran comes nearer being balanced than one that is freer. Second-day bread is somewhat more nutritious than fresh bread. Bread crust is more easily digested than the center of the loaf.

Fat people should eat little bread. Diabetics should eat still less.

Let us end by changing the quotation with which the first paragraph began. Let it read—Bread is *a* staff of life. To make it *the* staff of life causes ill health.

Sanitation in Bakeries.—Two reasons for sanitation in bakeries exist. The first is that the bread may be wholesome; the second, that the bakers may keep in good health.

People buy bread because it is a wholesome, nutritious, easily digested, economic food. They are willing to use bread made outside their own kitchens when they are satisfied that the process of making is carried on under conditions about as good as those prevailing in their own kitchens under their own eyes. The cordwood way of distributing bread—stacked up in a fly-abounding

salesroom, stacked up in an open wagon, stacked up on the arm of a delivery boy, stacked up on the floor of the back porch until someone takes it in—prevents many a woman from buying bakery bread.

Miss Howell, one of Professor Jordan's students at the University of Chicago, made a study of bread purchased from shops in different parts of Chicago. She found wrapped bread much cleaner than unwrapped. Of the unwrapped specimens 39 per cent were classed as dirty (bacterial average 14,000, maximum 120,000); 39 per cent as fair (bacterial average 4,000, maximum 20,000); 22 per cent clean (bacterial average 2,500, maximum 14,000).

Of the wrapped bread 45 per cent was fair (bacterial average 848, maximum 3,000), 55 per cent clean (bacterial average 371, maximum 2,200). She found that a few of these bacteria, though but few, were possible disease producers. A larger number, while not capable of producing disease, indicated practices that the consumer does not like to think about in the midst of his meal.

She thinks there is some possibility that the germs of consumption and typhoid, when present in the dough, can survive the baking temperature and exist in the bread capable of causing disease. The proof of this point is not satisfying. The proof that germs, and especially tubercle and typhoid bacilli, get on bread after it has been cooked and can spread disease is good.

The principal reason for bakery sanitation, however, is conservation of the health of the bakers. Bakeries in operation are always too warm. It is not possible to ventilate them perfectly. The bakery air usually contains a good deal of dust. It is difficult to keep the premises clean. Much of the work is done at night. The work is uneven. The mixing and doughing time is one of fast, hard work. Then come several hours with little to do—when the sponge is rising. This is followed by the hot, trying work of baking. This distribution of work is responsible for much use of the bakery as a sleeping place.

All in all, the work of baking puts such a strain on the vitality of the baker that he cannot keep in health unless the bakeshop conforms to sensible requirements as to light, ventilation, temperature, humidity, cleanliness, and toilet facilities.

MEAT

We are great meat eaters in this part of the world. In spite of everything that will be said, in spite of the prices that will prevail, we shall continue to be heavy meat eaters. However, we should take the trouble to be discriminating meat eaters, and that we are not now.

About one-third of the cost of food for an American family is spent for meat, and yet we blindly order one of a small number of cuts and leave the balance of the animal in little demand.

Hall and Emmett of the University of Illinois (Illinois State Bulletin No. 158) say that one-quarter of the weight of the carcass (loins and ribs) sells for one-half of the total selling price of the carcass. In other words, the failure of the people to buy other parts just about doubles the price of porterhouse and sirloin.

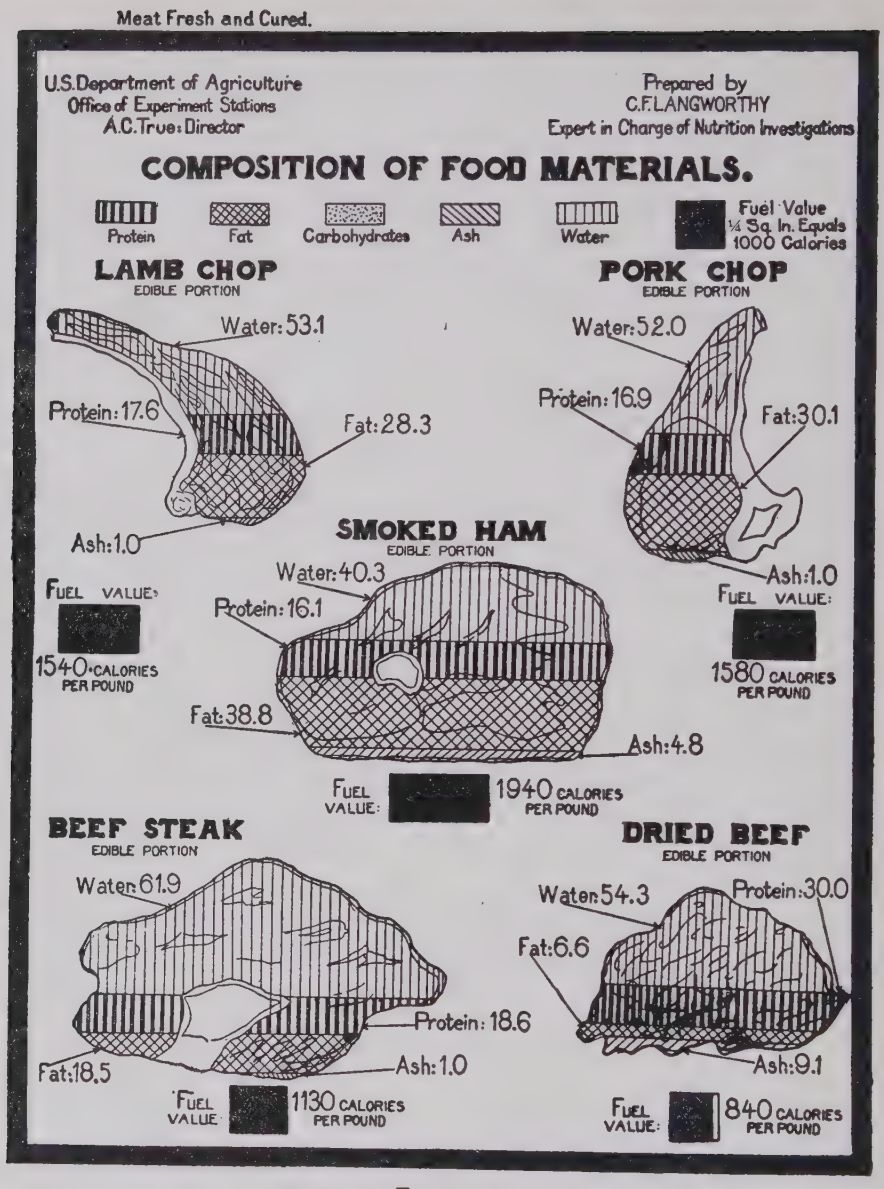
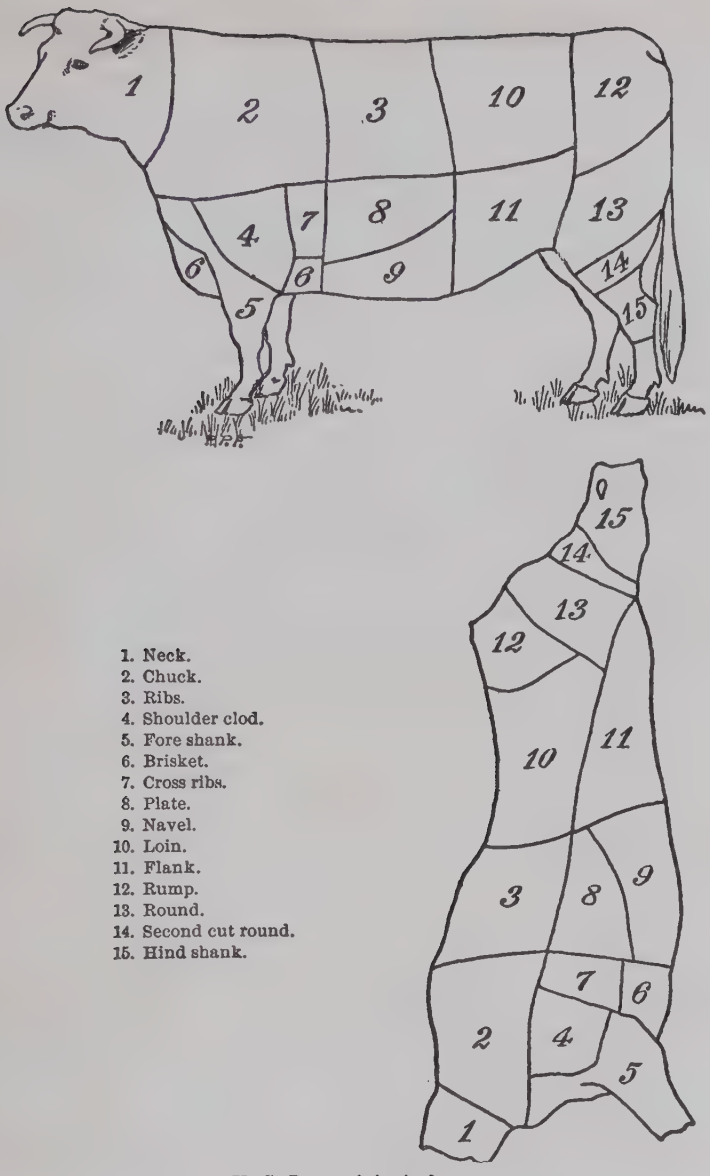


FIG. 166.

The "tastier" portions of the meat are those in the neighborhood of bones. The great health need is for greater consumption of fiber, skin, and tendon, and yet the premium is put upon muscle fiber—the portion which does not become "tasty" and individual in flavor until a skillful cook seasons it with substances to give it savor.

Hall and Emmett had a set of animals slaughtered under their eyes. They then cut the carcasses according to the approved lines of division. They



Farmers' Bulletin, 34, U. S. Dept. of Agriculture.

FIG. 167.—DIAGRAM OF CUTS OF BEEF.

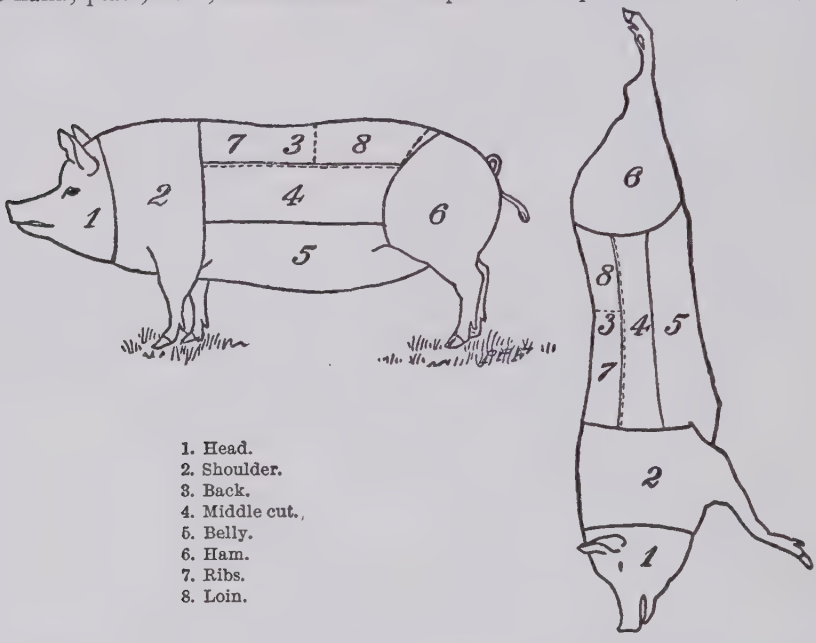
next determined the amount of lean, fat, and waste per pound in every cut.

From this, using the retail market price of the different cuts, they estimated the cost per pound of nutritious elements in each cut. They found that when a woman buys porterhouse hip bone at 25 cents she pays 29 cents for the usable food purchased. At the other end of the line was hind shank, middle cut (soup bone), selling at 5 cents and worth 6.3 cents. In between came porterhouse, regular price 25 cents, cost 27.2 cents; sirloin (round

bone), 20 cents, cost 21.1 cents; round steak (first cut), 15 cents, cost 15.3 cents; roast beef (rump), 12 cents, cost 12.8 cents, and round pot roast, 10 cents, cost 10.1 cents.

On the whole, the data clearly show that the cheaper cuts of beef are by far the most economical sources both of lean and of fat. Not only did they find that the food value is not in relation to price, but that there is no relation between flavor and cost. Furthermore, cooking tests showed that waste and shrinkage are not necessarily greater in the cheaper cuts.

In buying for the lean, the neck, shanks, and clods head the list, and rump, rib, and loin bring up in the rear from the standpoint of fuel value. The flank, plate, neck, and shank are cheapest at the price, and rib, loin, and



Farmers' Bulletin, 34, U. S. Dept. of Agriculture.

FIG. 168.—DIAGRAM OF CUTS OF PORK.

roast are the most expensive. From the standpoint of all combined, clod, chuck, and plate hold the head of the list.

Too Much Meat.—In von Noorden's interesting paper before the International Congress on Hygiene he had much to say about the use of meat. In gouty people he did not think dieting was of the importance held by most people. He agrees with Chittenden that *brain workers do not need the large amounts of meat taken by the average office man and that the excess throws a strain on his organs.*

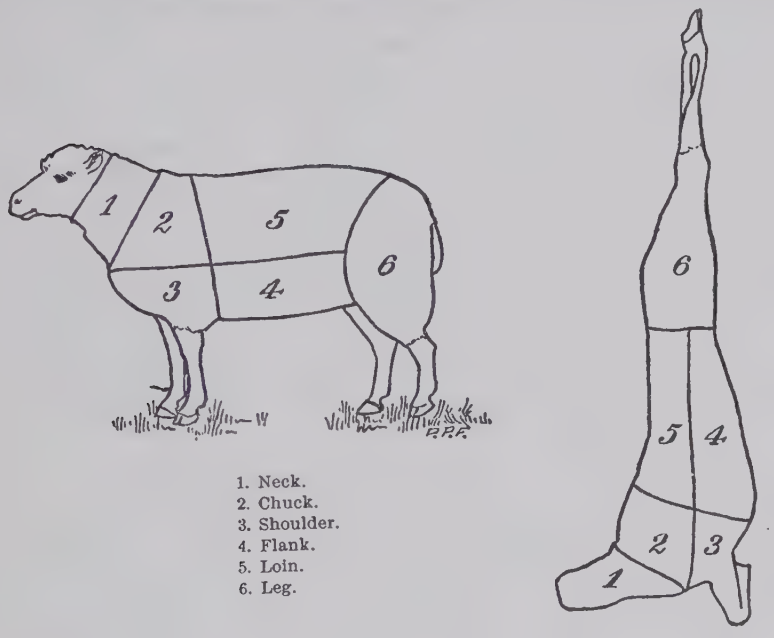
In gout if the disease is well developed the person should go on a vegetarian diet until he is better. He should at all times keep away from foods rich in purin bodies.

A meat that has much flavor, speaking generally, contains a good deal of purin bodies. The fat tasting proteids, such as milk, eggs, and boiled beef, are good. The extremely juicy steaks, the chops, roasts, ribs, backbone, and

the rich soups are bad. Other foods rich in purin bodies are coffee, chocolate, tea, halibut, and salmon. Beef extract and beef tea lead the list of the bad foods.

In fevers, meats are poorly borne. It is not so much the digestion in fevers, for digestion of meat may be highly satisfactory, but it makes the fever higher.

In goiter, meat is badly borne, especially in those who are losing flesh. There is a very close connection between digestive trouble and goiter. Some



Farmers' Bulletin, 34, U. S. Dept. of Agriculture.

FIG. 169.—DIAGRAM OF CUTS OF LAMB AND MUTTON.

people with enlarged thyroids do well when their digestion is good and do poorly when it is bad.

In addition to that von Noorden finds meat eating to be bad for the goiter itself and bad for the general nervous system of the subject. This means that the person with a goiter who is nervous thereby, who is losing flesh, and whose pulse is rapid and irritable should eat some meat but not much.

In certain cases of chronic constipation the subject complains of pains in certain nerve areas. These pains are so troublesome that the doctors often call it gout or rheumatism. Hot baths, electricity, and drugs do no good.

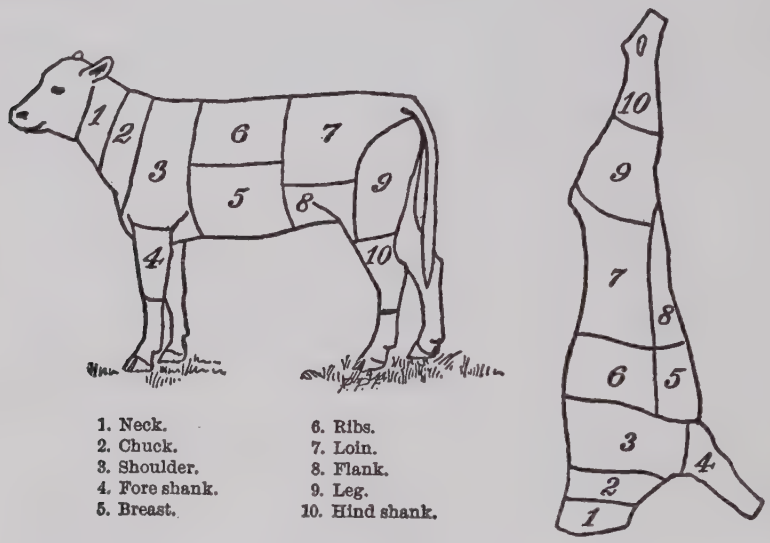
Von Noorden says the condition is a toxic neuritis. This means that the sore nerves are poisoned. The poison is generated in the large intestine. "The neuritis disappears with astonishing rapidity when the abnormal intestinal decompositions are stopped."

In certain of these cases he has got cures by stopping all meats for weeks and giving large quantities of milk, and, better still, soured milk or yogurt.

At first there is a great deal of indican in the urine. After a while

this disappears from the urine. After some weeks or months these patients can begin eating meat if they wish.

The old Mosaic law prohibited people from eating meat and milk together. Von Noorden thinks the discoveries of the last few years justify the prohibition.



Farmers' Bulletin, 34, U. S. Dept. of Agriculture.

FIG. 170.—DIAGRAM OF CUTS OF VEAL.

In fact, he believes generally in eating one kind of a food at a time. He cannot see anything in favor of a heavy feed of mixed food from "soup to nuts."

FROZEN CHICKENS

Ellis says those people who have nightmares about what will happen when socialism comes forget that socialism has been here a long, long time. He asks who would be an individualist as to his water supply.

The chicken industry is only partly brought under socialism. Some people raise their own chickens. Such can and should eat fresh chicken, but, unless a man can see the killing and cleaning, he had better stick to frozen chicken.

But the balance of us are under socialism or collectivism so far as the chicken industry is concerned. The city man who is not in a position to see the killing and cleaning of the chickens offered him should insist upon getting not only a chicken which has been frozen but one that is frozen at the time of purchase.

Dr. Pennington has been studying market chicken for the Department of Agriculture. She knows more about chickens than anybody else. She says city people get their chickens in very poor condition. The reason is that the housewife goes to market and demands a fresh chicken "and she gets the thawed companion of the frozen bird which may have deteriorated in

the hands of the retailer, and will deteriorate every hour that it is in her possession. As usual, ignorance and prejudice conduce to the disadvantage of all concerned."

This particular part of Dr. Pennington's report is in support of her advice to housewives in the city to buy no chicken that is not frozen at the time of purchase.

A dry-picked chicken, undrawn and frozen, and kept between 30° and 40° for twenty-four hours after killing, and so carried to the kitchen and there thawed in the refrigerator, is the only city chicken that should be eaten. The chickens killed by chicken killers in the city constitute no exception. *Without exception, so far as I have seen—and I have seen a great many chicken killing establishments—the places are filthy.*

The chickens are wet picked in hot dirty water. They are cleaned by unclean methods. They are thrown into wet, soggy barrels with loose ice. Then, ice packed, they are put on sale.

Dr. Pennington's researches show that wet picked, ice packed, soggy chickens deteriorate rapidly. They may look good and they may taste good at the end of twenty-four hours, but they will not keep good much longer than that. From coop to stove in the city is generally longer than twenty-four hours. When Thursday is killing day, and the kill will be on sale until the next Thursday, for instance, the consumer takes unwarranted chances. The chicken which has been killed in the country, scalded, picked, cleaned, packed with loose ice in barrels and thus shipped to market is still worse.

Dr. Pennington studied two chickens bacteriologically. One (A) was dry picked, then frozen and shipped. The other (B) was wet picked, ice packed, and shipped. At the end of twenty-four hours A had, roughly, 100 bacteria, B, 300; at the end of seven days, A, 300, B, 11,800; twelve days, A, 8,200, B, 102,000; sixteen days, A, 72,000, B, 307,000; nineteen days, A, 328,000, B, 1,083,000.

Demand that your market man send you an undrawn frozen chicken. Do not receive it unless it is frozen. Thaw it out in your own icebox.

FISH AS FOOD

The man who catches his fish, cleans and eats them within six hours after they leave the water gets a freshness and flavor that no possible treatment can preserve for the city man. Whether or not he has any advantage after twelve to twenty-four hours depends upon how well he has kept his catch from drying out, and what were his facilities for keeping them cold. The city man must eat fish that are days out of the water at the least. For him to try to get fresh fish, in the sense that the brookside fish eater uses the word, is, of course, rank folly.

The authorities have studied the keeping of fish along the same lines as the keeping of poultry has been studied. *One conclusion is that much of the trouble arises because the housewife insists on buying thawed fish believing that she thereby gets fresh fish.* This is unfortunate, for what is sold for fresh fish in a city has progressed far enough in deterioration to have lost

the savor of freshness, and sometimes to have gained harmful or dangerous qualities.

When fish are thawed out, put on sale, and then not sold, they are

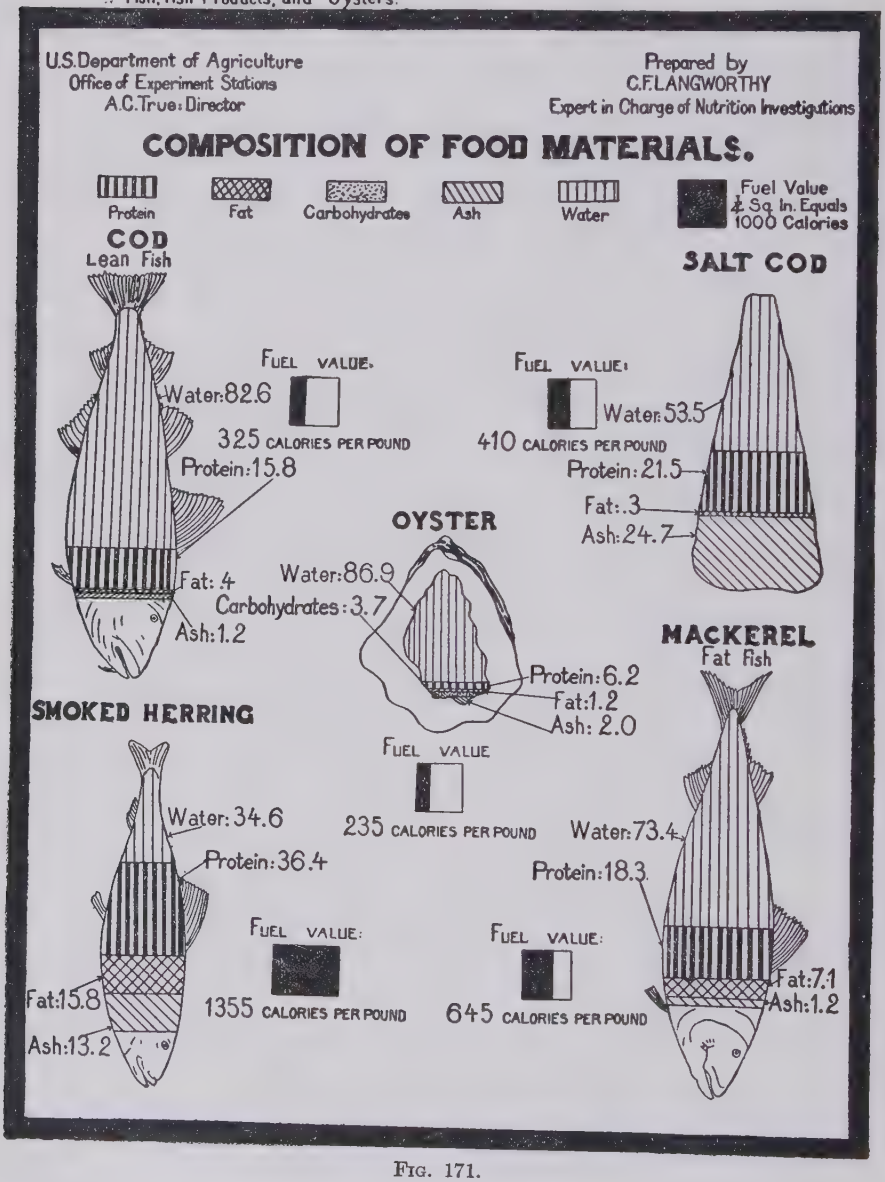


FIG. 171.

refrozen, to be rethawed next fish day. How often this happens no one knows. Experiments like this are harmful to the flesh of the fish. The consumer reaps the result.

How well fish will keep depends much upon how they are cleaned. Fish

from cold water keep better than fish from warmer water. Fish taken while feeding do not keep so well as others. Fish that have been bled and drained keep better than others. Fish that have been handled in an insanitary place and in an insanitary way spoil rapidly.

Fish that have been frozen hard keep better than fish mildly frozen—refrigerated fish. Mild freezing merely prevents the multiplication of the bacteria already in the flesh. Hard freezing crystallizes the water out of the flesh, and in that way dries it. Hard, frozen meat, therefore, is both too cold and too dry for bacterial growth, and therefore keeps extra well.

Every fisherman—and everybody is at times a fisherman—knows how easily fish spoil. All sorts of fish strings, fish buckets, and fish baskets have been devised to keep fish the few hours between catching and camp. The need of having everything clean everyone knows. The hygienic standards of commercial fish places must come up to kitchen standards.

Under all circumstances the consumer should demand a fish that has been frozen hard. He should demand that it reach the kitchen frozen. It should be thawed out in the kitchen refrigerator.

OYSTERS

Is it safe to eat oysters? Can oysters be eaten with safety in the months the names of which are without R? If it is safe to eat oysters at all, can they be made safe enough to eat the year round?

When oysters do harm it is because they are infected with typhoid or because they are spoiled. From time to time an epidemic of oyster-borne typhoid is reported.

Typhoid fever is reported to health departments. Upon receiving a report of a case of typhoid the source of the trouble is investigated by the department. Sometimes the cause is found to be the drinking water, sometimes milk, sometimes people, sometimes flies and sometimes oysters.

The reports of oyster-borne typhoid, especially those of recent years, have been closely investigated. It might appear that the danger of typhoid from eating oysters is increasing. If so, it is because of the closer study of the causes of the cases of typhoid fever. Actually, the danger of oyster-borne typhoid is decreasing.

Why is there any danger? Oysters grow in shallow water. They feed on the organic matter of the water. They feed most actively in warm weather. It has been the practice to float oysters, that is, to remove them from the growing beds and to leave them for a short time prior to marketing them in water different from the sea water of the beds. Floating was often done in badly sewage-polluted waters. The oysters were marketed in liquor, some part of which was raw water. The methods of icing and shipping were objectionable.

The digestive apparatus of the oyster is eaten. Oysters are eaten raw. These are the reasons oysters convey typhoid.

Oyster typhoid is growing less rapidly because some states are supervising the oyster beds in their waters. They are not allowing sewage to be discharged into oyster waters. They are not permitting oyster beds within

a certain distance of sewer outfalls nor in the course of currents of sewage. They are controlling the practice of floating. Shipping is now done with some regard to sanitary law.

A careful purchaser can now eat raw oysters without danger of typhoid. The question arises: Has not the time come when it is safe or it can be made safe to eat oysters at all seasons of the year—in summer as well as in winter? It has been found that oysters are safer from typhoid in winter than in summer. Perhaps this is because typhoid bacilli which get into the water near oyster beds die off more rapidly in cold weather. Possibly it is because when the water is very cold the oyster closes his shell and feeds but little.

But the difference in the typhoid content of oysters in the summer and winter does not equal the difference between clean oysters from clean beds and oysters that have been grown on polluted beds and floated in dilute sewage. Therefore, improvement in practices should make oysters from the typhoid standpoint safer in summer than they were in winter in the past.

The fear of oysters in summer time was due to the danger from spoiled oysters. The methods of handling have improved so much that I can see no reason why the eating of oysters in summer time can not be made safe. It is easy to foresee the oyster industry developed on the basis of a twelve months' supply and demand.

That there may be safety in eating oysters, demand as well as supply must have sanitary standards. The purchaser—demand—must refuse to purchase oysters unless they come from supervised waters, have been shipped in cold, clean containers, are on sale in cold, clean packages and are in good condition.

EGGS

It is not due to accident or chance or freakish fancy that eggs are in such general use as food. They have great food value; they are convenient; they are neutral in taste. When combined with fruit and bread they make a well balanced morning meal. Nothing else fits so well into the dress-eat-and-run policy so often necessary in the morning.

Aside from the nutritive qualities that can be analyzed, there are chemical substances in eggs, the uses of which the test tube cannot tell us much about—certain delicate phosphorus compounds whose work seems to be to stimulate other substances to help.

In order to get this effect from eggs, the consumer wants them fresh, with a certain delicate quality that is as baffling to analysis as are the organic chemical compounds.

The physicians even go so far in their quest of this fresh effect as to order sick people to eat their eggs raw—a procedure that is much safer with eggs than with milk.

However, to the city dweller fresh eggs seem to have disappeared. If we believe the advertisements, and try to make them fit the facts, we cannot escape the conclusion that hens are now laying eggs that are weeks old.

Several years ago the Department of Agriculture came to the rescue. It has issued three bulletins on eggs—circular 140, bulletins 141 and 160. Its investigators have found ample reasons for the prevailing conditions.

The complaint of the consumer is justified. Eggs are neither as good nor as cheap as they ought to be.

The complaint of the farmer and egg merchant is justified. There is not the money in eggs that there ought to be.

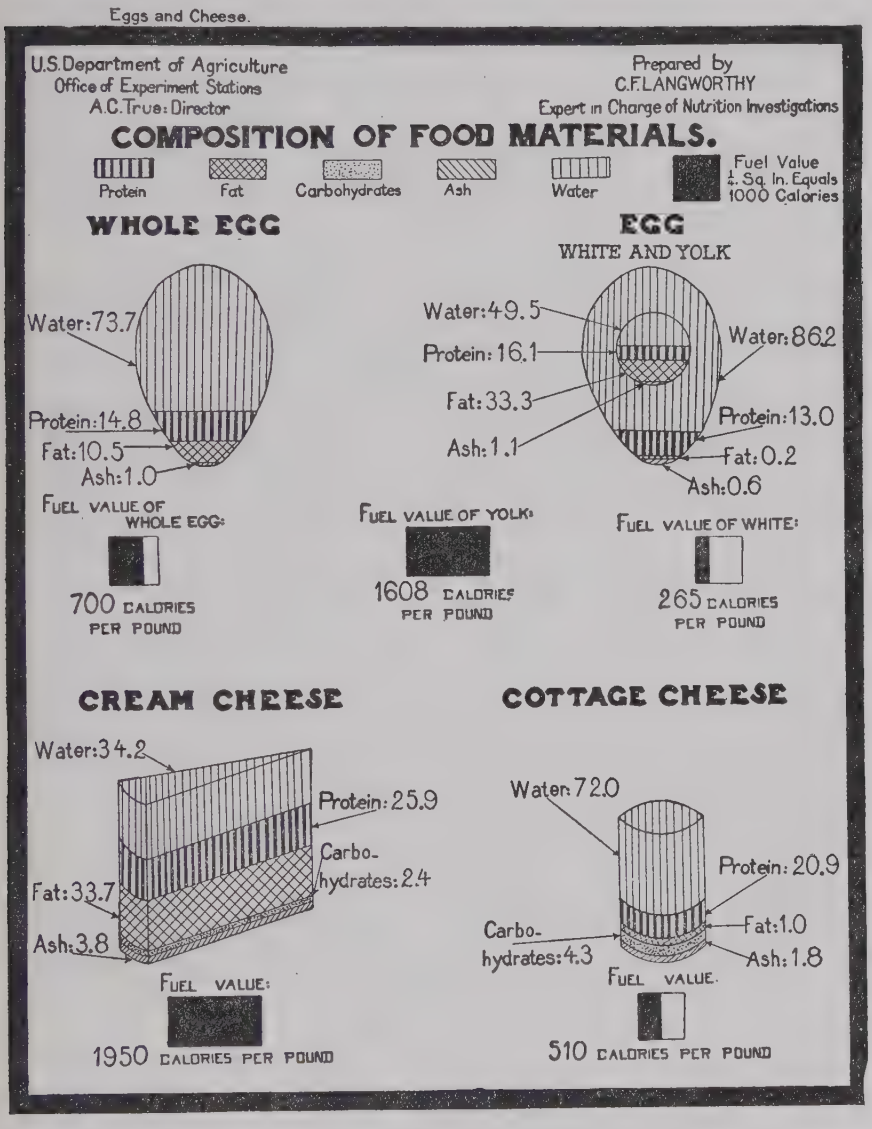


FIG. 172.

The reasons are several. *The consumer has been shying away from cold storage eggs, when there is no way of marketing eggs in cities except by storage. The farmer and merchant have been losing because they have had no system in their business.*

Nobody had ever studied the keeping qualities of eggs. There was no accurate information on the subject, and the old rule of thumb practices mixed a lot of foolishness in with some facts.

The five basic principles for the producer set forth by the bulletins are: Give the hens clean nests; gather eggs at least once daily; keep eggs in a cool, dry place; market eggs at least twice a week; kill or sell all mature male birds as soon as the hatching season closes. Of these the last is the most important.

The investigators found that an unheated room in a dwelling house is not conducive to good quality in eggs. The farmer should keep his eggs on ice or in a cyclone cellar.

The storekeeper should keep his eggs in the refrigerator, or at least in the cellar.

The railroad should transport eggs in a cold car. *Refrigeration, at least partial, from the hen to the consumer is advisable with infertile eggs and absolutely necessary with fertile eggs.*

Fertile eggs were found to spoil almost as readily as milk. The investigators found that washing eggs does not help much. While getting rid of the dirt is a gain, the washing removes a protective mucilaginous coat from the shell and is about an equal offset.

During the latter part of the month of March, all through the month of April, and until the middle of May is the natural time for hens to lay. At this season everybody can buy new laid eggs, for a very good reason—there are no other eggs to be had. The surplus of the previous year has been disposed of and all storage places are cleaned out and prepared for the new supply.

The eggs are produced so fast in the spring that farmers rush them to market to get them out of the way and for the further reasons that they have more time, and in some localities there is danger that the eggs may freeze. The spring eggs are firmer and of better flavor than at any other season, because it is the natural season for laying and the hens are then grain fed.

During the rest of the year only a limited number of newly laid eggs reach the general market. Some of the better groceries receive a small quantity of eggs within a day or two after they are laid, and some, indeed, have the date upon which they were laid stamped on the shell; but they cannot depend upon the shipments all the year through.

Aside from the limited number, the fresh eggs that are offered in the market during most of the year are three weeks old. The farmer is at least a week gathering a sufficient number to make it worth while to take them to market. The country dealer takes another week to get enough to make a shipment to the city, and another week is consumed before the eggs are placed on sale.

Market Classification.—In the public market eggs are divided into eleven different classes by the trade, and sometimes more than eleven. The best the market affords is called "extras," 80 per cent fresh; the second is called "prime firsts," 65 per cent fresh; then follow "firsts," 45 per cent fresh; "ordinary firsts," 30 per cent fresh. In all the grades that follow the word "fresh" is not used; presumably they are just eggs. They are "No. 1 dirties," "No. 2 dirties," "seconds," "checks," "broken," and "spots."

One would think there was nothing in the egg line worth less than a

broken egg, but the trade has given eggs that show a decayed spot before the candle light the name of "spots." Lower down in the scale of infamy it is not possible for an egg to go and still find a place in the market reports.

Flavor of Eggs.—*Eggs, like milk, readily absorb odors about them. They should never be packed in musty straw nor in bad smelling boxes. They should never be allowed to get wet. Such treatment will be noticed in the flavor within a few hours.*

The seasons also have an influence upon the flavor and keeping quality of eggs. The March and April eggs are the best and can be kept the longest. The October and November eggs are the next best.

The green grass and other things that hens eat while running at large in the summer injure the flavor, while the summer heat debilitates the hen and robs the eggs of firmness and keeping quality.

Storage.—Eggs are put into cold storage whenever there is a surplus. The month of April produces more eggs than any other month, hence April leads all other months in storage. As the April eggs are of better keeping quality than those of any other month, they are the best for storage purposes. An April storage egg is better at Christmas than an August storage egg, because it is of better quality to start with. Taking the market as a whole there are more eggs in storage about May 1 than at any other season. The quantity grows less each month and is exhausted in February as the spring supply begins to arrive.

Less than 10 per cent of all the eggs produced go into cold storage, and it may be said that cold storage offers the only good way to keep eggs.

Great care is required in storing eggs. The lofts where they are kept must be scrupulously clean and kept clean as well as ventilated. There must be no other article capable of giving off an odor stored in the same room.

A whole roomful of eggs has been known to be tainted by the odor of lemons stored in an adjoining room and separated from the eggs by a brick wall. Eggs in cold storage will give up an odor acquired in storage when the source of the odor is removed.

The temperature required is about 32° F. Under proper conditions eggs can be stored for ten months and come out in remarkably good condition. The less an egg is handled and the sooner it can go into storage after it is laid the better. Little change takes place in eggs in ten months of storage.

The eggs that come out of storage wrong were wrong before they were put in, or perhaps an accident may have occurred in storage and an even temperature not been maintained.

The popular notion that eggs are stored for two years at a time or even longer is an error. It is not done for the reason that the eggs would not keep, and it would not pay if they did keep. Cold storage of eggs has been blamed in other ways for sins it did not commit. The best stored eggs to be had in seasons of scarcity are those of cold storage.

Country Held Eggs.—*A large part of the stale eggs that find their way to the market are what is known to the trade as country held stock. They are held on the farms or at the country stores where the facilities are bad.*

There is no regular way of keeping eggs on the farm. Sometimes they are kept in a receptacle in a damp cellar with cabbages, onions, and other

produce. Sometimes they are kept behind the kitchen stove or other unsuitable places. In such circumstances the eggs are off in flavor in two or three days, and in two weeks they are stale.

In the summer time hens steal their nests away and they are not found until some or all the eggs are faulty. These go to market in due season. These eggs, if kept in country stores in the same room with all sorts of goods, are still further injured. It is from such sources that a large part of the stale eggs come that are found in city markets. The cold storage eggs are good by comparison.

There is real need for some plan that will place the new laid eggs at once in the cool temperature that is necessary for their preservation. There also is need for a campaign of education that will reach the farmers and inform them how eggs should be cared for and the necessity of rushing them to the cooler at once. Perhaps the butter and cheese factories that are scattered over the country could be made agencies for egg collection as well as milk collection. It would at least have the merit of taking the eggs away from the farmer every day, and as a cool room is necessary for butter, a moderate extension would do for the cold storage of eggs until shipped to the large warehouses.

Retailing Eggs.—After eggs come out of storage and before they are placed in the retail market they are usually candled and graded. Candling is done by holding each egg before a candle or other bright light in a space where the diffused light of the room is excluded. Expert candlers can detect the changes in the eggs and grade them with wonderful accuracy.

By this process several grades of eggs are sometimes obtained, each grade worth less than the other. In the retail markets two of these different grades may appear side by side. The patron is permitted to believe the best grade are new laid eggs and that the others are cold storage eggs. Indeed, the better grades are sometimes labeled fresh eggs, and the joke of it is that usually the buyer does not know the difference when the eggs are used.

The average palate cannot tell the difference between a newly laid egg and one that may be called near fresh. This is especially true of eggs that are taken from the shell before they are cooked. Those who prefer to eat their eggs from the shell must have them newly laid, as whatever flavors the egg contains are all retained. Even stale eggs may be used for cooking as a part ingredient of a dish and give little or no offense to the taste.

Season of Greatest Scarcity.—*When hens are moulting they will not lay eggs, and the moulting season is in the fall. The only newly laid eggs to be had at this time are the products of the early spring chickens. Well conditioned pullets will lay at the age of nine months. Chickens that are hatched February 1 will begin laying November 1, and sometimes earlier. These are practically the only new laid eggs to be had in November, hence the limitations of the supply.*

In very cold weather hens do not lay, and this accounts for the shortage of newly laid eggs during the winter. During the season of shortage housekeepers should avoid eggs that have been held in the country. All labels on eggs in the grocery, such as "fresh country eggs," are deceptive. The eggs may be fresh arrivals from the country but may have been held

in the country for weeks and even months. Such signs should be regarded with suspicion.

The best stored eggs are those of cold storage. In the lean egg season the buyer should ask for fresh tasting cold storage eggs. By knowing the history of the eggs he has for sale and after careful candling the dealer can or should be able to know which eggs are fresh tasting and which grade are stale to the taste. It may be laid down as a rule that all eggs that are held by any other process than cold storage will be stale to the taste.

Cold storage eggs should be used the same day they are taken from storage, especially if they are to be eaten from the shell. If the eggs are taken from storage and allowed to lie around the grocery a few days, and a few days more at home, they all will taste stale. Here again the patron should inquire of the dealer and learn when the eggs left the cold storage. It is the duty of the housekeeper to know and to take advantage of all these points. When that is done there will be no more trouble with bad eggs in the market.

The future is full of promise of better things for dwellers in cities in the way of food products from both farm and garden. The parcel post, if rightly used, is an agency that will bring newly laid eggs directly from the producer to the consumer. In addition to the shortening of the time between the producer and the consumer it should make better prices for the farmer, and, by cutting out express or freight charges and the miscellaneous profit, it should reduce the cost to the consumer.

As the business of the parcel post increases in volume new means of transportation doubtless will be established and probably be publicly owned and operated. The new lines will be run by electric power and will have branches extended into the country around so that the perishable food products that are gleaned in the country today may be brought to the city tonight and served on the tables tomorrow.

CHEESE

Milk in the form of cheese is wholesome. *The type of cheese called American is liable to produce constipation for the same reason that milk produces it—because it is so concentrated, so free from waste.* The more highly flavored cheeses have enough of bacterial products in them to overcome this objection.

Eaten slowly, well masticated, and well mixed with other food, cheese is highly digestible. The rarebit fiend develops nightmare, not because of the cheese, but because he eats a heavy meal while in a condition of mental excitement, and then goes to bed. The fault is not with the cheese.

Cheese is good, nutritious food. Cheese is man-made. It follows that some cheese is well made, made in a cleanly fashion, and properly protected against dirt and contagion. It also follows that some cheese belongs in the other group.

Probably most cheese, when stored, is, like most natural ice when stored, scarcely to be called safe food. But before the green is out, the contagion is out. This, however, is not true of tuberculosis. Galtier Harrison in Canada, and Mohler at Washington have proved that tubercle bacilli can stay alive in

Cheddar cheese for more than four months; in Emmenthaler they die more quickly.

The flavors of cheese are due to bacteria. Cheese makers have been trying for years to grow the bacteria of the different cheeses so that the milk could be first sterilized and then the culture added. In this way they could get a more uniform product, a better product, and one that would never contain live consumption germs.

These efforts began more than ten years ago, but Sammis tells us that when the Chicago ordinance requiring that cheese be made only from pasteurized milk was passed in 1908 no practical way of making American cheese in this manner had been found.

However, the experimenters got busy. Soon signs advertising cheese from pasteurized milk appeared, and now the agricultural department is out with a bulletin in which it tells of two years' practical experience with the new method of cheese making.

The cheese was made at the University of Wisconsin. It was put out as a regular market commodity without letting the purchaser know that it was out of the ordinary.

Samples were submitted to cheese graders. The cheese was graded higher than ordinary market cheese. It was much more uniform. It kept better.

From the market standpoint it was more economical to make, it went away less frequently, and the trade liked it.

It was all right in practical use as well as in theory. And it was free from live tubercle bacilli.

MUSHROOMS

Mushrooms have considerable food value; they appeal to the taste; they can be had for the searching; and as a search for mushrooms adds zest to an outing, many people go to the woods basket in hand.

Before writing this I asked a librarian how to tell harmful mushrooms. He told me that the eating test is about the only one of value. Unfortunately this test will never become popular and the "before taking" tests are mostly worthless. Certainly the silver spoon test is no good.

The government bulletins give testing points that, in a general way, are of some value. They say mushrooms are fairly safe if they come from a clean looking place, show firm white flesh when broken, and smell like freshly ground meal; that they are dangerous if, on pressure, a milky fluid exudes, if the flesh is soft and spongy or hard and "corky," if it turns green or blue, if the odor is bad, or the taste is acrid or unpleasant.

As a matter of fact the mushroom hunter generally knows one or two edible varieties and he sticks to what he knows, rejecting all others. If he applies the spoon test or any other he does not pay much attention to the results. He is not guided by them. Following this plan, he rejects many kinds of edible mushrooms, but, at that, he is wise. He searches farther to fill his basket and lives to search another day. *The wise man is he who leaves wild mushrooms to themselves and cultivates the mushrooms he eats.*

Mushrooms are not so nutritious as meat, bread, corn, peas, tomatoes, or any of the ordinary foods. A pound of round steak is nearly five times

and a pint of milk nearly twice as nutritious as a pound of mushrooms. They are not as wholesome a summer food as are fresh vegetables and fruit. Where their value comes in is that they can be grown fresh for midwinter use, at which time the human system does not get all the fresh vegetables needed. There is no other vegetable that can be grown in a crowded city in winter and that, therefore, can come on the table but a few hours after coming out of the soil. This gives mushrooms distinctly a health phase. *They can be preserved in summer and kept for winter use, but, as a canned vegetable they are less wholesome than peas, tomatoes, corn, peaches, or pears.*

Perhaps half the people in a large city and practically all of those in small cities and towns are so situated as to make mushroom growing possible. The spawn can be had in any seed store, bulletins telling how to prepare the soil and how to care for the crop can be had from the Department of Agriculture and a basement space eight feet square is within easy reach. Preparing the soil is an art; but the rudiments of it can be learned from these bulletins, or probably there are expert mushroom soil preparers who furnish soil ready to use.

Many fungus growths are edible when they first come through the ground. All are dangerous when they are old or begin to shrink. Even the familiar mushrooms should be rejected when old. They are only prime when fresh.

FRUIT AS FOOD

The eating of fruit, like working on water colors, is considered a refined indulgence. Those who would consider it improper to launch into a slice of buttered bread outside of home or a regular eating place, will gravely and with dignified viciousness hack into an apple in the office or even in the street.

Fruit probably was the first food of man. It still is universally recommended and eaten. There are those who use it sensibly as a part of their diet; there are others who would make a meal of it.

Many growing children are given an apple for their lunch at school. We have seen young women in office and factory who take little else than an apple or two for their noonday lunch.

Cheating the body by the esthetic looks and savory flavor of fruit is no better than cheating it in any other way.

The nutritive value of fruits is very small. About 80 per cent of the bulk of fresh fruits is water. The tissue building substances, the proteids, are present in less than 1 per cent. Sugars and starches are present in considerable quantities—from 6 to 15 per cent in fresh fruit. Wood fiber, a very important element, averages about 5 per cent. Acids vary from 1 to 3 per cent. Of salts and extracts, there is about ½ per cent of each.

Plums are richest in water and acids, grapes and cherries in sugar, cherries and peaches in fiber, apricots in salts. Bananas are the lazy man's food in all tropical countries. They contain 20 per cent. of sugar, 2 per cent of proteid, and some starch and fat. Dried fruits have greater nutritive value, containing less water and considerably more sugar, proteids, and salts.

The value of fruit as a food is in the following order:

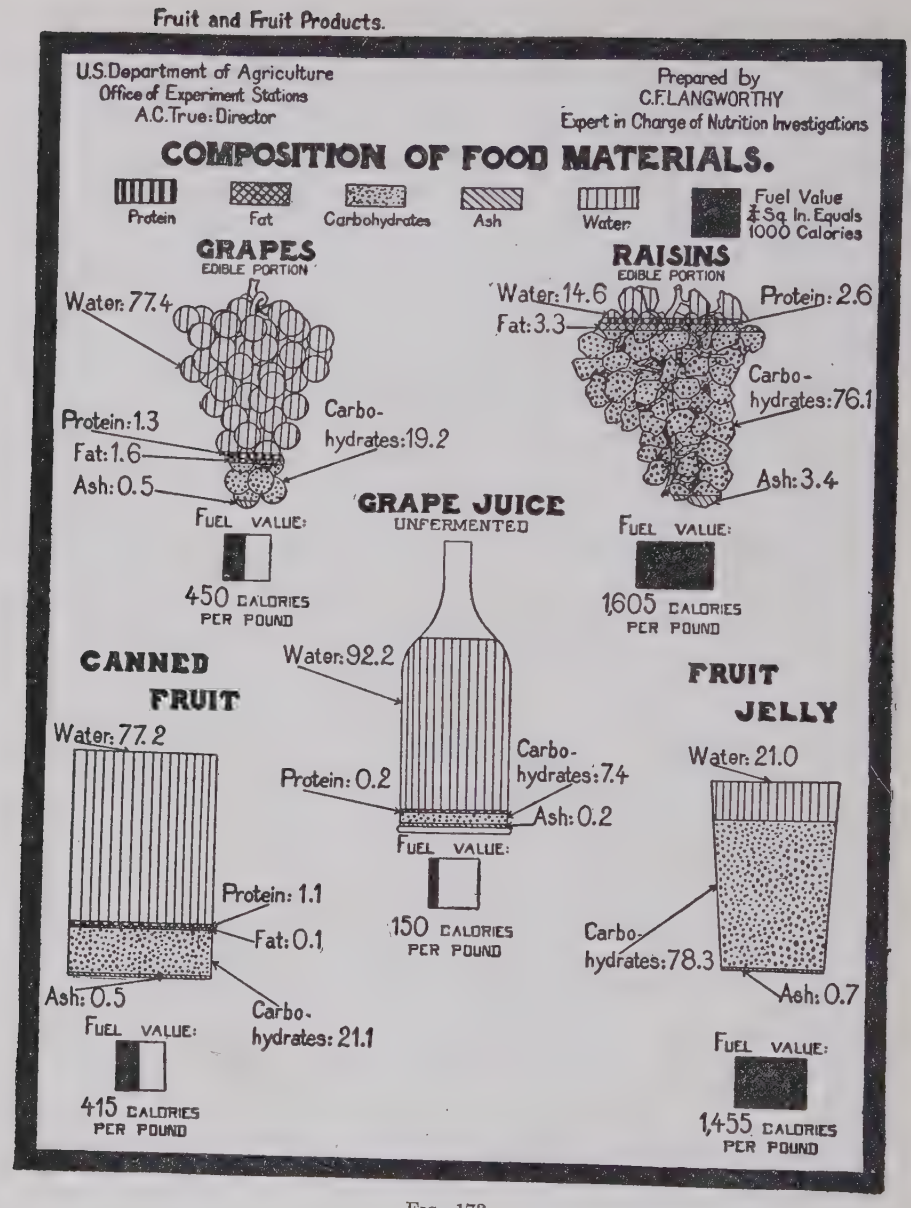


FIG. 173.

1. Because it is appetizing and palatable.
2. Because it is refreshing and thirst quenching.
3. Because of its nutritive properties.
4. On account of its salts and acids.
5. On account of its action on the kidneys.
6. Because of its laxative properties.

For its appetizing value, fruit should be eaten before meals. Fruit

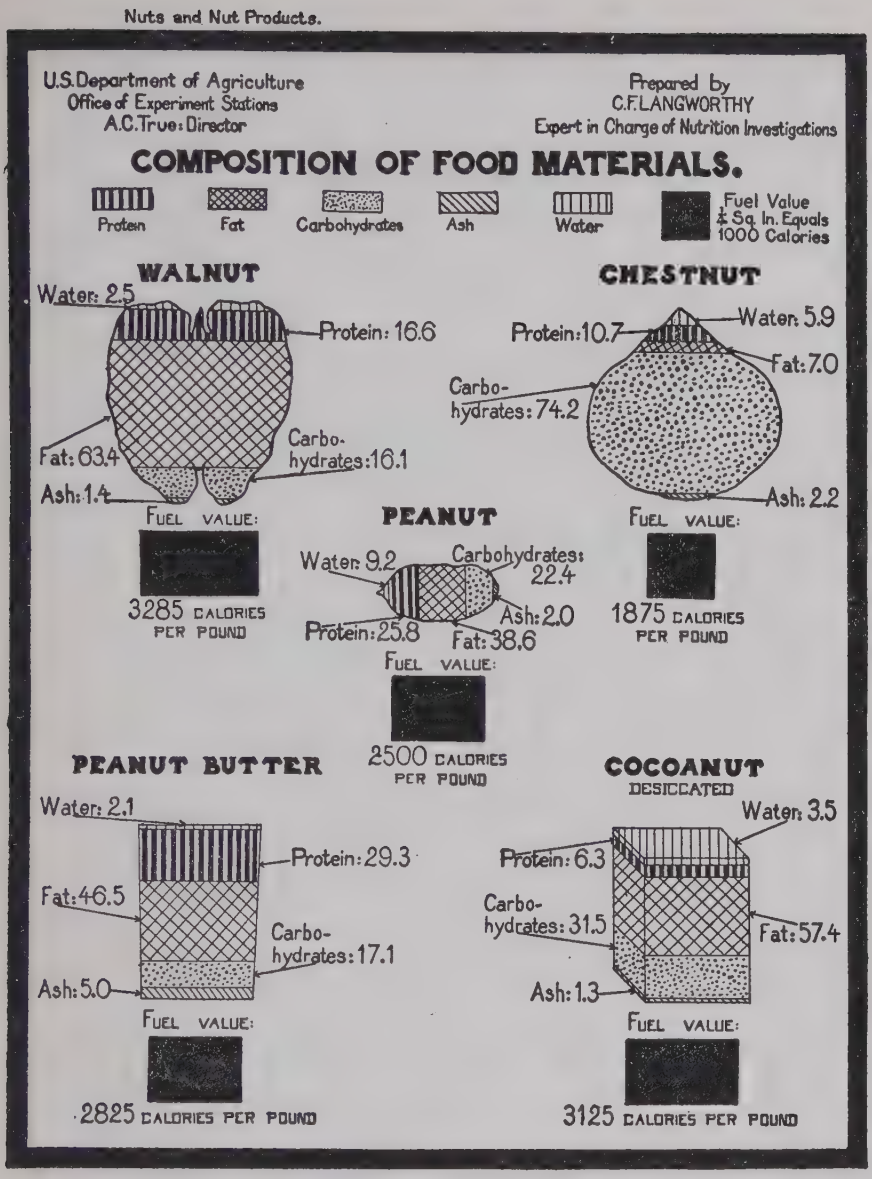


Fig. 174.

soup, a dish extensively used in Germany but little known in this country, would serve the purpose very nicely.

For its nutritive value, fruit is best taken as dessert at the end of the meal.

As a laxative, it should be taken on an empty stomach, preferably soon after rising in the morning, instead of before bedtime, as many people are in the habit of taking it. An apple can stay in the stomach for three

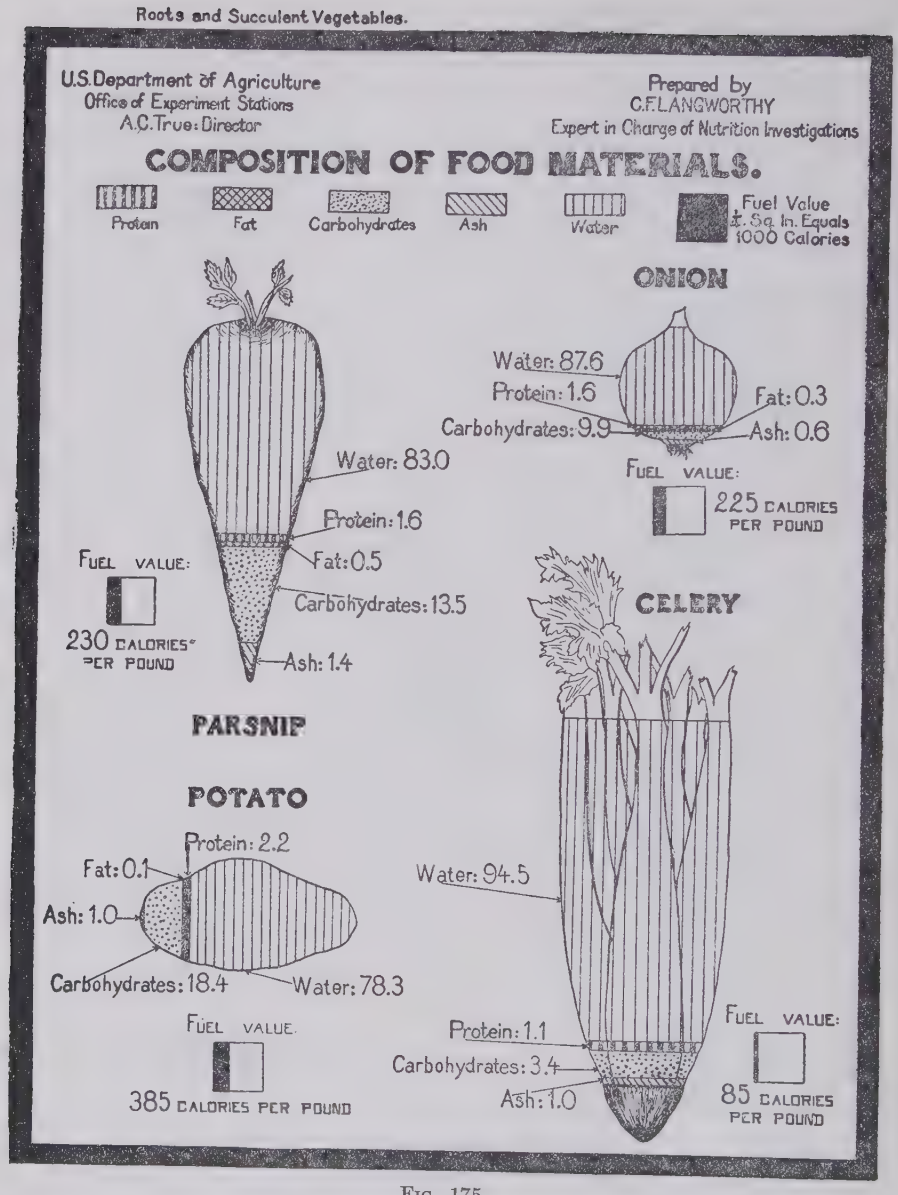


FIG. 175.

hours, and, if taken just before bedtime, often will disturb sleep. Laxative fruits are figs, raisins, prunes, apples, grapes, gooseberries, plums, and currants.

Fruit should not be eaten to excess, is best eaten at mealtime, and should not be eaten when unripe or overripe. *Persons suffering from sour stomach should eat fruit guardedly.* Fruits and grains make a good combination at meals; sour fruits and milk do not go together.

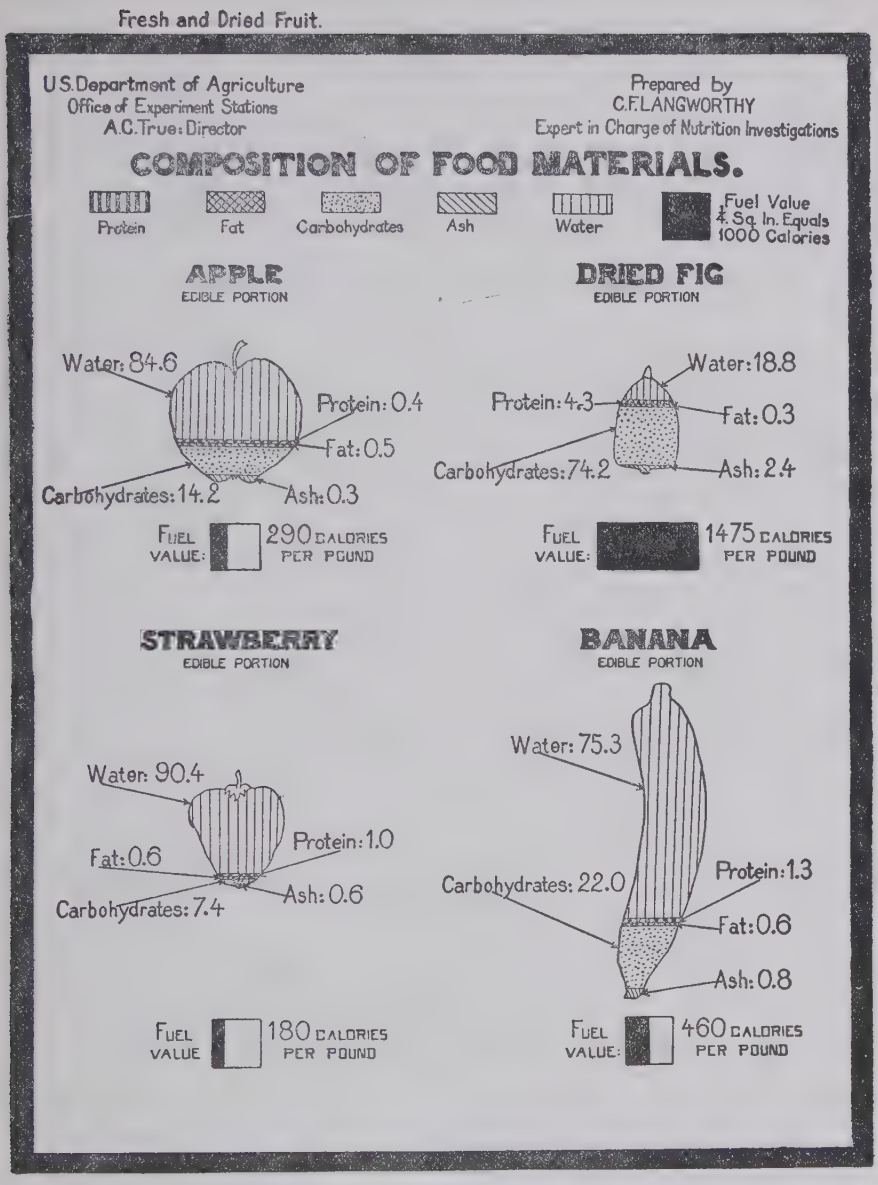


FIG. 176.

Fruit always should be thoroughly washed before eating. Dirt and filth are not more esthetic nor less harmful because they perch themselves on the glowing cheek of an apple or the graceful lines of a pear. Cooked or stewed fruit is easier to digest but not so nutritious.

The "grape cure," practiced in Germany for obesity, consists of an exclusive grape diet. Nothing else is allowed. From one to eight pounds are gradually allowed daily. The significant fact is that the patients are re-

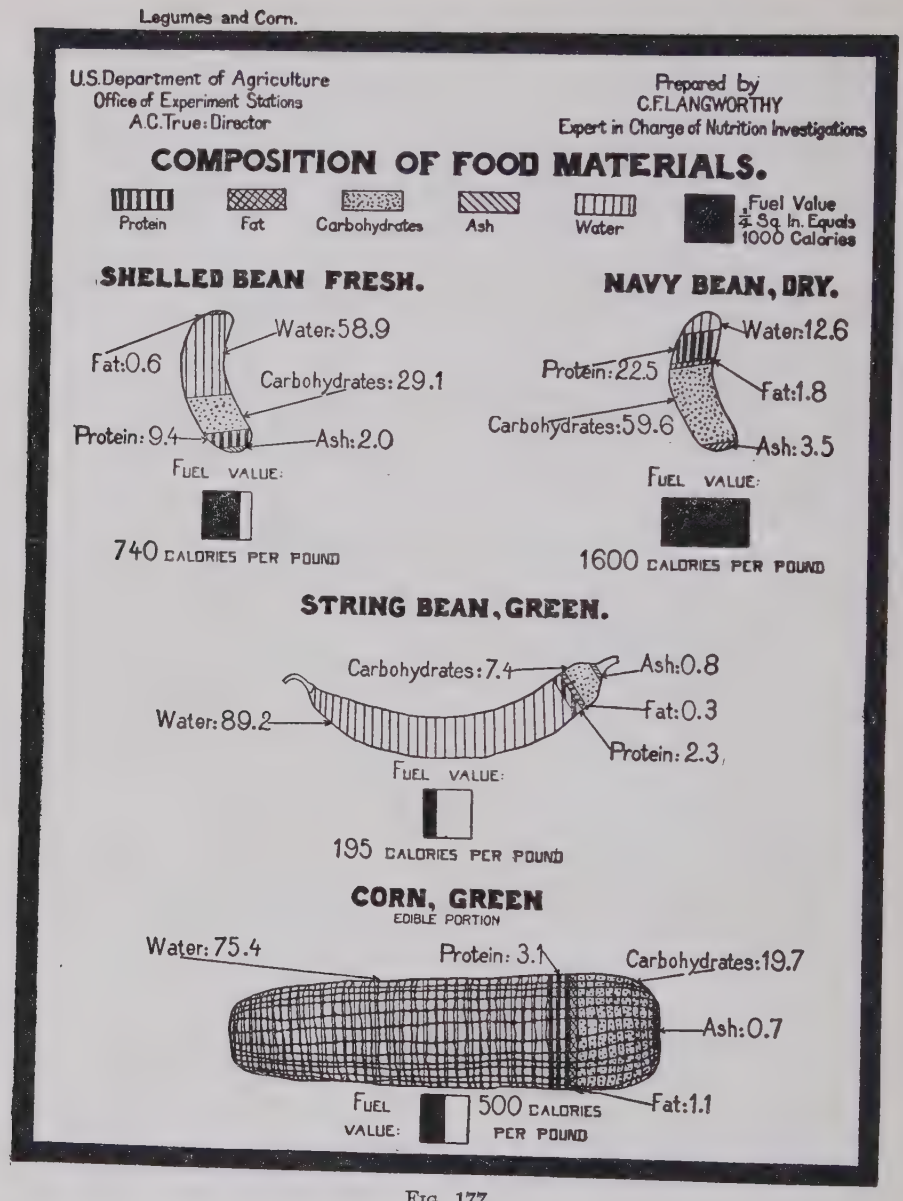


FIG. 177.

quired to pick all the grapes themselves, thus securing the advantages of open air exercise.

Use fruit as an adjunct to your diet. Use it to prevent scurvy, to overcome constipation, to prevent overeating. Do not use it to replace meat and bread; to build up the body, to repair waste. Eat it because you need it but do not eat it with the idea that it is cheap food. And finally clean it before eating it.

COTTONSEED FOOD

The Public Health Service is telling the people that they need not have pellagra. It says that pellagra is preventable. There is no doubt but that the people are afraid of pellagra. Their attitude about it is different from their attitude toward malaria. They are not indifferent about malaria.

There is a fair chance that people will listen to what these authorities

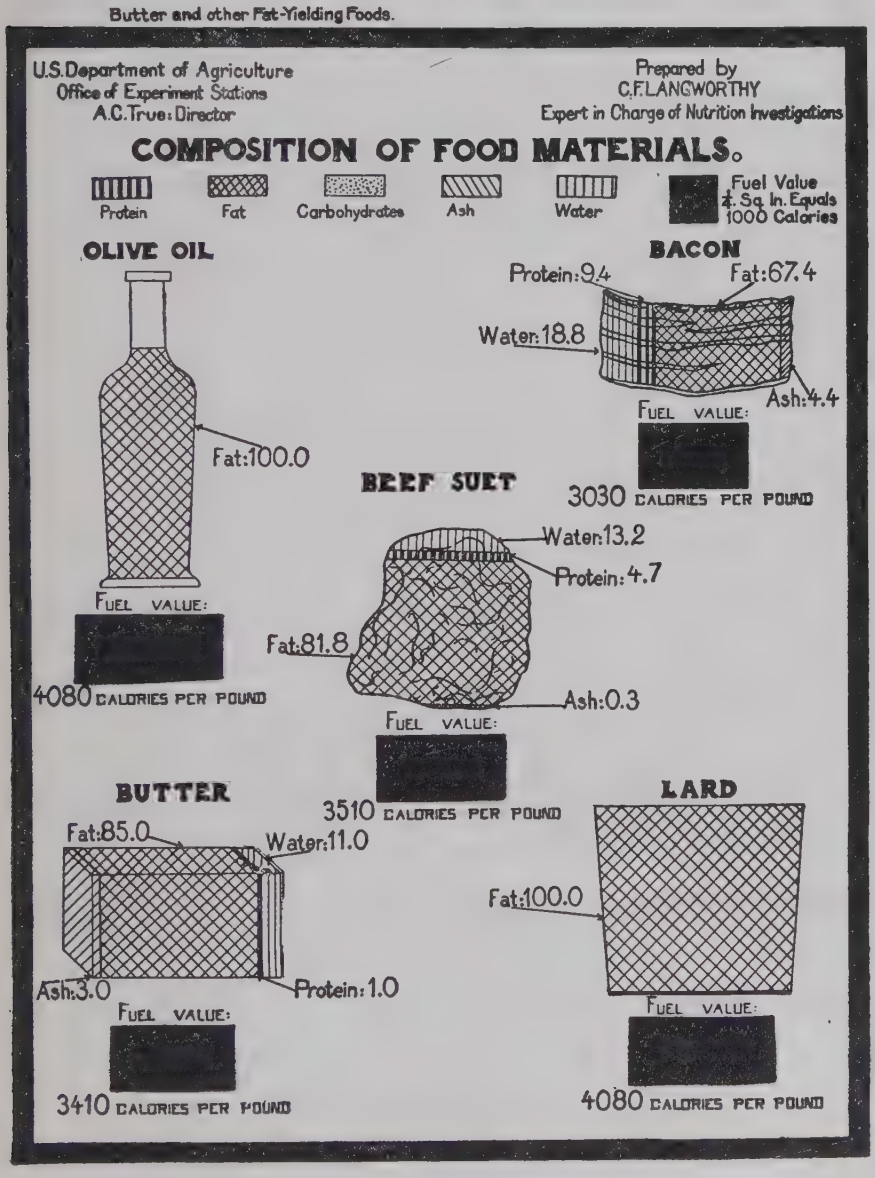


FIG. 178.

say. They say that pellagra results from prolonged eating of an ill balanced ration—too much corn bread, too much sow belly, too much molasses, too much plum pie, and too many blackberries in summer, too little lean meat, fresh vegetables, fruit and milk.

They advise especially that the farmers plant peas and beans and that these become very staple articles of diet. There is no tastier vegetable than cornfield peas. They grow well in every part of the country where pellagra abounds. They contain just the ingredients which the public health people say are needed to prevent pellagra. Cornfield peas should be growing in the rows of every cornfield in the South.

I do not know that the Public Health Service men have experimented with cottonseed meal cakes and cottonseed flour biscuits, but they might profitably do so. Anyone might try them. Cottonseed meal and flour are rich in protein. Dr. Goldberger says many of the Southern people do not eat enough protein and that pellagra develops as the result of the shortcomings.

The Texas Experiment Station Bulletin No. 163 gives the result of feeding tests with cottonseed baking goods. One part cottonseed meal or flour to four parts of cornmeal or wheat flour were mixed for cakes, biscuits, and muffins, using the same recipes as for cornmeal or wheat flour. For instance the recipe for cottonseed corn cakes was as follows:

Cottonseed meal or flour	1-3 cup
Cornmeal	1 1-3 cups
Eggs	2
Lard	1½ teaspoonfuls

The cottonseed meal used was a fresh meal from fresh seed. It was free from lint and hulls. It was sifted through a twenty mesh sieve. It was a fine yellow powder made by roller process.

Professor Rather says that cottonseed meal bread is a substitute for meat. It should be eaten instead of meat or by people who do not eat enough meat. It is very digestible. It is cheap. A pound of protein in cottonseed meal costs one-twentieth as much as a pound of protein in eggs or one-fifteenth as much as a pound of protein in meat.

It is so rich that people are disposed to eat too much without knowing it. Rather says that a man does not need and should not eat more than two ounces of the meal a day.

PASTEURIZED BUTTER

One of the striking exhibits at the International Tuberculosis Congress at Washington showed that butter made from tubercular milk could cause tuberculosis. The proof is overwhelming and it comes from every part of the world. Whether the butter was salted or unsalted, fresh or stored, the results were the same.

Some will remember the Asheville story of an epidemic of typhoid along a certain butter route, back of which was a woman nursing her child sick

with typhoid and making fresh country butter for a discriminating group of city people.

Schroeder, in "Milk and Its Relation to the Public Health," says:

"Tuberculosis among dairy cows is so common and widespread that we cannot hope to clean all dairy herds for some time to come; hence it is necessary for the protection of health to avail ourselves of the one expedient which is immediately at hand, and that is pasteurization, and pasteurization should not be restricted to milk, but must be extended to all dairy products."

Acting upon this opinion (an opinion so general in the Agricultural Department that it may be interpreted as the official opinion), the federal government has been testing out the different pasteurizing methods as applied to butter.

Butter was made of raw milk and of milk pasteurized at temperatures ranging from 140° to almost 200°, almost up to boiling. The butter was tested in many different ways. Some of it was submitted to butter experts, one of whom was Mr. Newman, assistant food commissioner of Illinois.

The opinion of these experts was that butter made from pasteurized milk, in addition to being safe, was the better butter. The temperatures which gave the best butter were 155° to 180°. Over 180°, the butter tasted scorched. Under 155°, the scores were not quite so good.

One reason was that the ferments of the milk were not destroyed and these caused the butter to go off a little after forty days of storage. The ordinary ferments of milk are peroxidase, catalase, galactose and lipase. There are those who think that milk should not be heated enough to destroy these. These butter tests showed that the butter is better if the milk has been heated enough to destroy them.

Peroxidase is killed at about 170°, catalase at 168°, galactose is weakened materially at 160°, but is still present at 200°; lipase disappears at about 160°.

The conclusion of Dr. Rogers is that held pasteurization, 140° for thirty minutes, does not make as good butter as flash pasteurization or retarded pasteurization at 165° or over. This is the first time that flash pasteurizers have had an inning. The commissioners studying fresh milk favor the other method.

Incidentally, the men working on ferments found the scientific reason for throwing away the rusty cans. Butter and cheese made from milk kept in rusty cans will not score up to grade.

Half the butter is now made from pasteurized milk. It is the safest butter now on the market.

The Milk Standards Commission voted unanimously that all butter should be made from pasteurized milk. The danger that raw butter will carry infection they regard as considerable enough to warrant this precaution. With butter it is safety first. Flavor is less important. Then, too, tastes differ. Some of the speakers at the Commission hearing on butter thought the flavor of butter from raw milk was better. As noted above some authorities hold the flavor of pasteurized butter to be better.

MILK

Skim Milk and Buttermilk.—Milk contains about eighty-eight parts water and twelve parts solids. Of these twelve parts, four are fats. The use of the fat is to make heat. As it is burned up in the body it has no power to repair waste and only moderate power of furnishing energy.

Recognizing it as a heat maker, why pay good money for it when you are paying other good money for things to keep you cool? You buy ice to put in your glass of milk to keep you cool, and you buy cream with your milk to keep you hot.

Skim milk contains every particle of the milk except the fat. At that, about one-tenth of the fat is left behind, if the milk is creamery skimmed, and even more if hand skimmed.

A pint of skim milk will repair more tissue, furnish a little more energy and make about half as much heat as a pint of whole milk—and it will cost less. Five pints of skim milk will furnish as much food value as a pound of round steak, and cost a quarter as much. A glass of skim milk and a half pound of bread will furnish one-third enough nutriment for an entire day, and will cost five cents. And skim milk is good for babies in extremely hot weather.

Another advantage is that the cream always contains three times as many bacteria as whole milk. Therefore, where cream is skimmed from milk a large proportion of the bacteria is carried with it, and the skim is left with but few bacteria.

However, a better form of milk for hot weather is buttermilk. It, too, is skim milk. If the butter man has been after results he has left but ½ of 1 per cent of fat in the buttermilk.

Buttermilk has still another advantage. Its albumin is more easily digested than the albumin of sweet milk. The albumin of sweet milk is mildly alkaline. When it is swallowed it always curdles in the stomach. The stomach and intestinal juices must get into and the stomach muscles must break up these curds. Occasionally they are leathery and tough.

The albumins of buttermilk are acid. They do not form leathery curds. They are more easily digested. When babies are fed buttermilk they do not pass the so-called curds composed of masses of fat.

Buttermilk is always a better hot weather food than whole milk for grown people, and sometimes it is for babies. On a hot day it is better to drink buttermilk than beer over a bar.

If the saloonkeepers want to do the right thing let them keep buttermilk on tap.

Sour Milk as Food.—Men have always eaten sour milk. Cottage cheese, curd, whey, and buttermilk as foods are used all over the world and always have been. Sweet milk furnishes a baby about what it needs and in an easily digested form. For the human baby, human milk contains ingredients in about the proper proportions. The proportions of the ingredients in cows' milk is not right for babies and, as a further consideration, when babies have grown into youths and adults, sweet milk is no longer a perfect food.

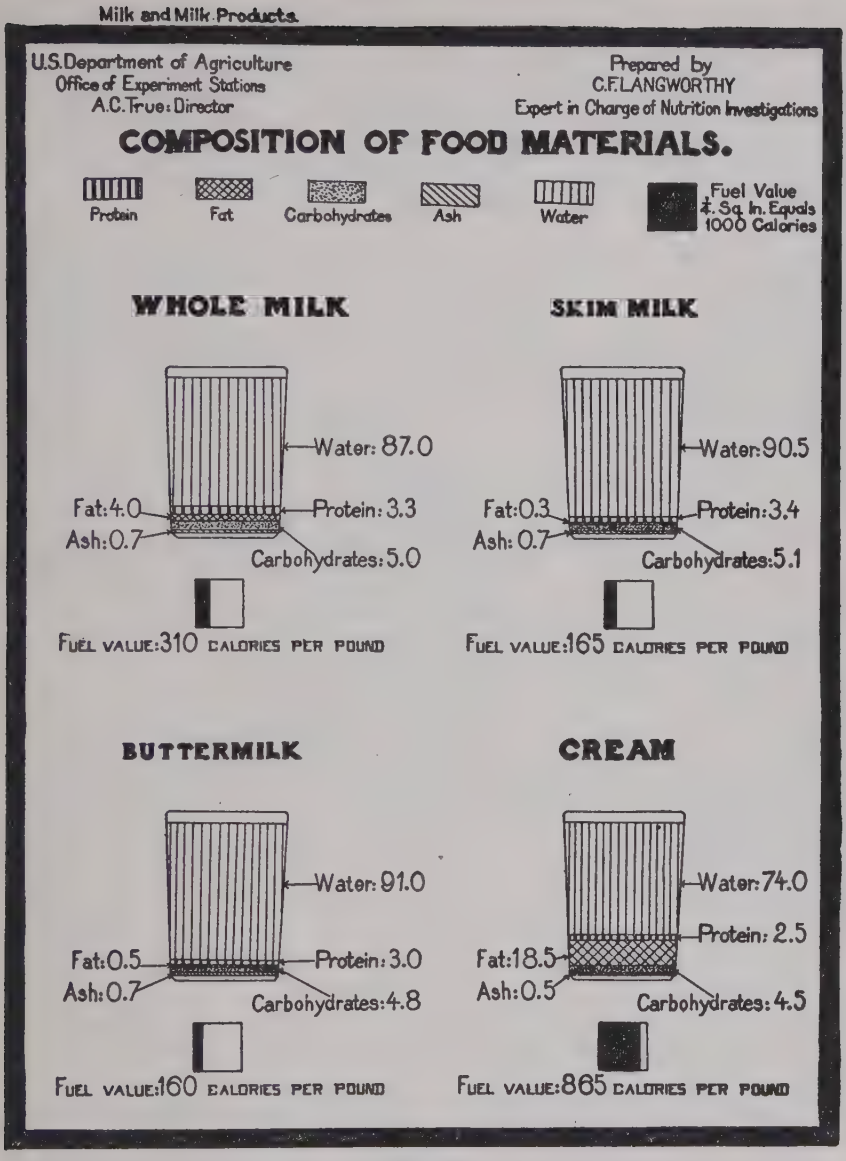


FIG. 179.

When milk is taken into the stomach, it is at once converted from a liquid to a solid food. One-eighth of it is made use of as food and the other seven-eighths as water. The albumin, normally present in milk as alkali albumin, is converted into acid albumin, whereupon digestion begins.

Men have always anticipated these two preparatory steps of digestion by drinking soured milk, sometimes with the albumin in large, solid masses as in clabber and sometimes in small mixed particles, solid particles and albumin in solution as in buttermilk.

But the people who have made most use of soured milk are the Bulgarians and their neighbors. Almost ten years ago a Swiss scientist studied Bulgarian milk-souring cultures, for in that country every housewife has her culture just as with us every housewife has her yeast. Among the three germs always found present was a long, heavy bacillus, which had a prodigious capacity to make acid and a remarkable capacity to live in the acid produced, for it is a universal law of nature that what we make kills us.

This bacillus is what people expect, and occasionally get, when they buy lactic acid tablets, cultures in tubes or bottles of culture. It is impossible to say which is best, since there has been no effort made to standardize any of them. A few laboratory workers have tested the different kinds on the market, but nobody has gone far enough with it to help the situation practically. Certainly it has not reached the standardization of the bread yeast and beer ferment industries.

If the tablet kinds are to be used, one to three tablets are to be put into a glass of sweetened water (several lumps to the glass), which is allowed to stand until they are broken up. Then the mixture, sediment especially, is to be swallowed, preferably during the meal. If the culture in sealed tubes is used, the culture should be diluted with sweetened water and used in the same way. If the culture in bottles is used, the prescribed dose can be taken straight or in sweetened charged water.

Other things being equal, the dried cultures in tablets are best. It is better that the bacillus awaiting use should be dry and inactive as they are in tablets.

Three days after the use of bacillus has been begun, it can be proved that it has passed through the intestinal tract. It then takes about eight days for it to become fairly well acclimated and that acclimatization having been effected the bacilli will remain in the intestine about twelve days over the last dose taken. To make it live longer in the intestine is the end sought by Metchnikoff in his recommendations that patients eat sugars and starches in abundance and take this second bacillus recently recommended.

Condensed, Evaporated, and Desiccated Milk.—These milk products have advantages over fresh milk. They likewise have disadvantages. The less milk is tampered with the better, which means that a baby at the breast is the only arrangement that meets with full approval.

His milk cannot be tampered with. All other forms of baby milk have been tampered with. When a milk has been drawn from a cow into a can, manhandled on the farm, hauled for miles to a railroad station, shipped on a milk train, hauled to a dairy, clarified, pasteurized, bottled and delivered, it has been tampered with. The only question is which tampering is best for the baby—that to which fluid milk is subjected or that undergone by evaporated, condensed and desiccated milks.

Evaporated milk has been put through the following process: Good milk is taken. Some of the fat is taken from it. The milk is heated almost to the boiling point. It is evaporated about one hour at a temperature of 140° in a vacuum pan. The temperature is then raised almost to the boiling point and the product is canned. It contains 68 parts of water instead of 88 as in the case of fresh milk. The solids are about 2½ times those of fresh milk.

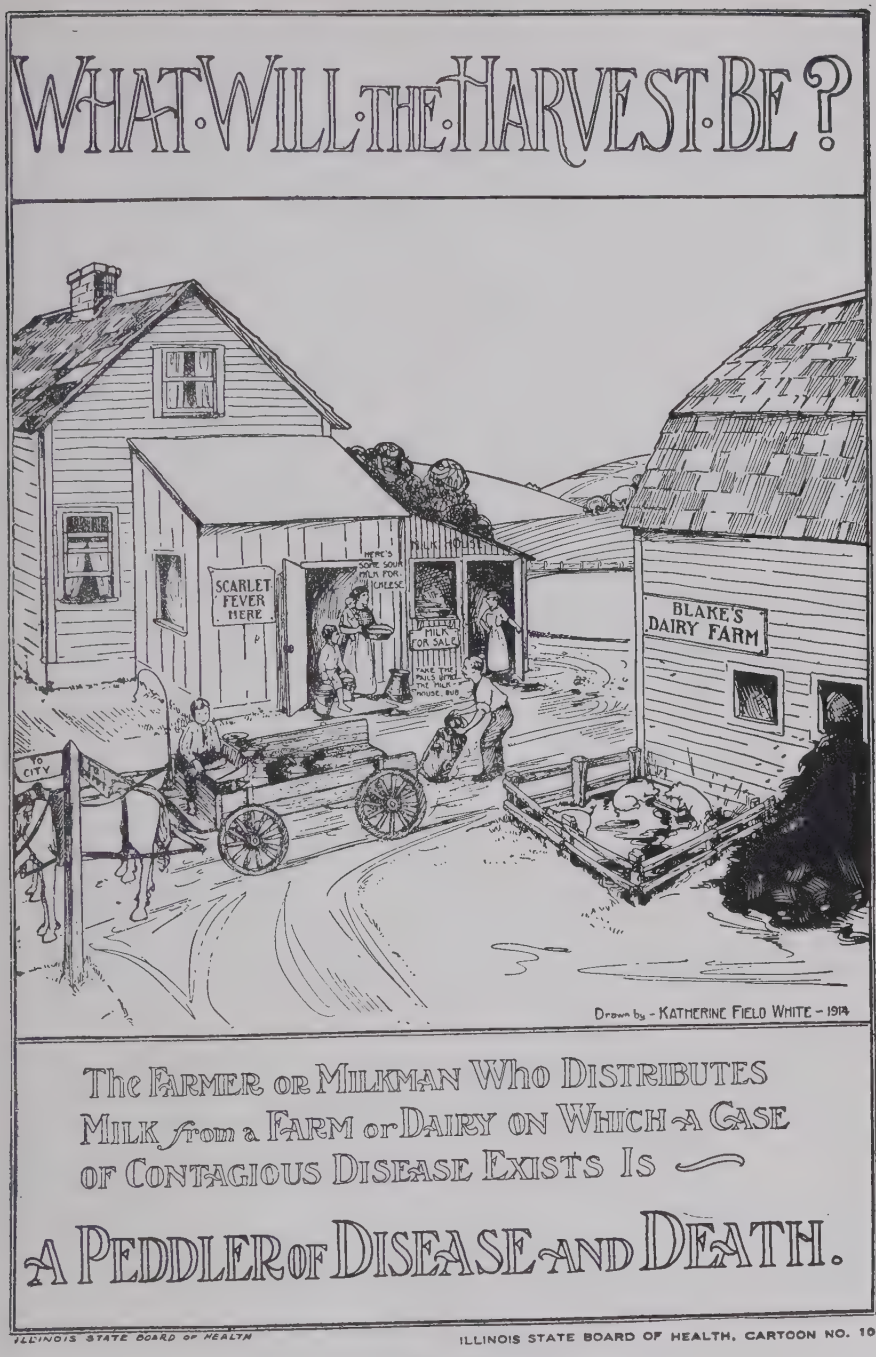

WHAT WILL THE HARVEST BE?
SCARLET FEVER HERE
HERE'S SOME SOUR MILK FOR CHEESE
MILK HOUSE
DIPHTHERIA MILK FOR SALE
TAKE THE PAILS UPTO THE MILK HOUSE, BUB
BLAKE'S DAIRY FARM
TO CITY
Drawn by - KATHERINE FIELD WHITE - 1914
The Farmer or Milkman Who Distributes Milk from a Farm or Dairy on Which a Case of Contagious Disease Exists Is
A PEDDLER OF DISEASE AND DEATH.
ILLINOIS STATE BOARD OF HEALTH
ILLINOIS STATE BOARD OF HEALTH. CARTOON NO. 10

FIG. 180.

It is sterile. A can when opened contains neither disease-producing bacteria nor bacteria of decomposition.

By condensed milk is meant what is often spoken of as sweetened condensed milk. The process is the same as for evaporated milk except that the temperature is not raised at the end of the evaporating process. Enough cane sugar is added to make the mixture 40 per cent sugar. It is then canned and sealed. Sweetened condensed milk does not contain any disease-producing bacteria when the can is opened but there is nearly always a considerable number of other bacteria.

Desiccated milk is milk evaporated down to dryness.

And now for the advantages and disadvantages of the different milks as compared with fresh milk. The great advantage is that they do not contain tubercle bacilli or typhoid or any other bacteria of that group. They do not contain bacteria of decomposition. Those are great advantages. The disadvantage is that the food ingredients are in different proportions from those of fresh milk. The sugar is too high in all kinds and especially in sweetened condensed milk. The fats are too low. And they are all cooked milks.

Babies fed on condensed milk are liable to be overfat, soft and flabby. Some of them get scurvy and others get rickets. Babies fed on these milks must be closely watched for these conditions. Almost every one of them will need fruit juice, meat juice and strained vegetable soups at times.

If a mother cannot have an icebox or if she cannot get cold, clean, fresh milk she had better feed her baby on the canned milks. For her the advantages are greater than the disadvantages.

Two other groups of people should use canned milk by preference—travelers, including picnickers, and soldiers.

When the cow has taken the woman's place and when, in between the cow and the baby, cow trains and wagons, pails, cans, and many hands have been run, it is late in the game to introduce objections to tampering.

If there is no ice to keep the milk, and if it is reasonably certain that the milk is not typhoid free, then evaporated, condensed, or desiccated milk should take the place of fresh milk. This about means that three groups of people should use these milks—babies in homes where there is no ice, travelers, including picnickers, and soldiers.

Evaporated milk is milk from which some of the water has been driven. Instead of being 88 parts water, as is whole milk, it has 68 parts water. The solids are about twice and a half the proportions found in whole milk.

Grown persons can use it for years without special precautions. Babies fed on concentrated milks for a long time may develop scurvy or rickets, or may get too fat. Therefore, when concentrated milk is being used as a baby food it is necessary to watch the baby with unusual care. If somebody will stay on guard the danger of scurvy, rickets, and obesity will be of no importance.

On the other hand, concentrated milks are sterile when they go to the consumer. They are sterile when the consumer opens the package. The consumer can be certain that there is no tuberculosis, typhoid, scarlet fever, diphtheria, or septic sore throat in the can. Furthermore, after being opened the milk will keep twice as long as will ordinary milk.

Sweetened condensed milk is evaporated milk to which sugar has been added. It was evaporated at a lower temperature than evaporated milk, and, in consequence, it is not so much cooked. But, on the other hand, the excess of sugar goes to make fat rather than health and resistance.

The desiccated milks, or powdered milks, are those from which still more water has been driven. They have not come into general use for baby feeding, but grown people find them convenient as well as wholesome and nutritious.

The federal government is beginning to control the condensed milk business, which means that the product will be more uniform, truer to label, and generally more meritorious.

FOOD ECONOMICS

In the purchase of food for a family allowance must be made for waste. The average waste in an American household is 10 to 20 per cent, according to the way the kitchen is run. Another, say 5 per cent, should be allowed for the loss in cooking.

Take milk. Ninety-seven per cent is digested and absorbed. Figured on the basis of usable calories it is a good purchase.

It takes food forty-eight hours to pass through the alimentary tract. Five hours are required for the passage through the stomach and small intestine; forty-three hours for the large intestine. What happens to the large intestine must not be left out of the calculation. The three per cent wastage from milk is not enough for the work of the large intestine.

After the food has been eaten the digestive apparatus fails to digest and absorb all of the food values. There is about 9 per cent loss on this score. Therefore, a very learned housewife will calculate the number of calories needed to nourish her family and then she will increase the figures by about 35 per cent to allow for these elements of waste.

If she is wise she will figure which foods furnish her the calories estimated to be necessary at the lowest cost. But if she has more common sense in addition to her knowledge and her wisdom, she will buy some articles of diet not because they show up well in the calculation but because the system needs them for one reason or another.

Some foods should be used for reasons that do not show on a balance sheet. Fruits on analysis do not show well, yet the freest use of them is to be recommended. A food, the use of which cannot be justified on a food value basis, may be a good "buy," because it furnishes bulk to the intestinal contents.

To illustrate, let us use milk. Of milk 97 per cent is absorbed and so little bulk is left that constipation results. Of the forty-eight hours which food takes in its passage through the body five is taken in passing through the stomach, five in passing through the small intestines, and forty-three in passing through the eight feet of large intestines.

And for another reason, rough foods must not be lost sight of. A man needs about 300 grains of minerals a day—mostly common salt and phosphates, small amounts of lime and iron, and a trace of sand. These are not of much service when physically mixed with food—they must be in

chemical combination. For instance, salt sprinkled on food passes through the system without being stored, while salt which is a chemical part of food, which has been grown into it by the cabbage plant or the beef steer, phosphorus which has been mixed in the milk by the cow or formed into the egg by the hen, is that which counts.

Therefore bran, peelings, shreds, fibers, skin, crusts, husks—all have values which do not show on the balance sheets.

DIGESTIBILITY OF FOODS

There is no doubt but that the preparation of food influences its digestion. Foods having a pleasant odor and an attractive appearance stimulate the appetite. Pawlow got a world-wide reputation for discovering these facts —facts known always and by all men.

Atwater says: "Generally speaking, the most readily digested animal foods were materials of soft consistency. White meats, for example, chicken, leave the stomach more quickly than red meats or dark meats, for instance, duck.

"The method of cooking also exerts a very marked influence on stomach digestion. Fresh fish was found to be more readily digested than meats.

"As regards vegetable foods in general, the consistency and the amounts of solid material were again principal factors affecting the time required for digestion in the stomach. Mealy potatoes, for instance, were more easily digested than waxy potatoes, and mashed potatoes more readily than potatoes cut up in pieces. Fine bread was more quickly digested than coarse bread."

Experiments have shown that the addition of butter to bread and vegetables lengthens the time the food remains in the stomach and upper intestines. Sugar, bread, and potatoes remain only a short time in the stomach and upper intestines, and make the least demand on the digestive secretions. Flour gruels, cream, and beef are completely assimilated. Cooked fruit digests more easily than raw. Potato with fat pork remains in the stomach longer than potato mixed with butter or cream. Experiments have shown that mutton, like beef, is almost completely assimilated.

Generally speaking, dried vegetables are much harder to digest than when fresh. A large part of the vegetables contain tough cellulose or fiber which is not digested. The laxative vegetables are spinach, tomatoes, and most green vegetables when fresh and well cooked. *As a general rule, the vegetables which grow above ground are more digestible when fresh and young (with the exception of celery), and those which grow below ground are starchy and more indigestible.*

The digestibility of fruits depends largely upon the ripeness and freshness. Some people have an idiosyncrasy against fruits, such as strawberries, pineapples, and so forth, and cannot, therefore, digest them properly.

The more digestible fruits are grapes, oranges, grapefruit, lemons, cooked apples, figs, peaches, cantaloupes, blackberries, strawberries, and raspberries.

PRESERVE FRUITS FOR WINTER USE

During his service in the United States Senate reporters told us that Senator Stephenson, of Wisconsin, was "doctoring" the senate. It appears that, nearly a half century ago, Senator Stephenson got an aloes prescription from one of Chicago's great physicians of that day—Dr. R. N. Isham. That prescription, containing aloes, he has since used and is now using to prolong the lives of senators beyond the Biblical limitation.

Now, the use of aloes for this purpose is good, but the discovery that constipation makes for senility cannot be patented by Senator Stephenson.

One variety of aloes is known as the Socratine aloes. Whether Socrates used it I do not know, but we do know that the drug has been used on the Socratine island since the time of Alexander the Great.

A few years ago Metchnikoff gave the relation of constipation to old age careful and scientific study and suggested a plan which he thought an improvement over the Stephenson plan. While these scientists, Professor Metchnikoff at the Pasteur Institute in Paris, and Senator Stephenson and his lieutenant, Tillman, in Washington, are contending there is something which the housewife can be doing in July and August about which there is no room for argument.

Constipation contributes to senility. Deficiency of fruits and vegetables in the daily diet contributes to constipation. Many more people suffer from constipation in winter than in summer—at least four times as many. Why? Winter foods are more concentrated. In saving for the winter, we store the kernel and throw away the hull. When winter comes, we live on meat and white bread. In case we buy fruit and vegetables, we eat sparingly of them since their use, in winter, runs into money. The way out of this is to pick up fruit and vegetable bargains when they are plentiful and cheap and can, can, can. Then next winter the mother will feel that the family can afford to eat fruits and vegetables lavishly and better health will result.

The object of cooking and preserving is to sterilize. If sugar is not used, the vegetables canned must be sterile else they will not keep. If the peaches and other fruits are mixed with an equal quantity of sugar, they need not be completely sterile since sugar prevents some bacterial growth. Canned fruits and vegetables are clean and sterile. *As winter foods, preserves, jellies, pickles, and canned vegetables are better than medicine.*

The housewife, though she has not known it, has been a working bacteriologist all along. Professor Koch had nothing on her. What he discovered in the late seventies, she had been doing for a century. Had the laboratory scientists gone into the kitchen or the housewives into the laboratory the science of bacteriology might have gotten under way in 1779 instead of 1879.

Constipation leads to ill health and induces premature senility. The Stephenson aloes plan for preventing the effects of constipation is better than nothing.

The Metchnikoff plan along the same general line to prevent the forma-

tion of senility-inducing chemicals in the large intestine is better than the Stephenson aloes plan.

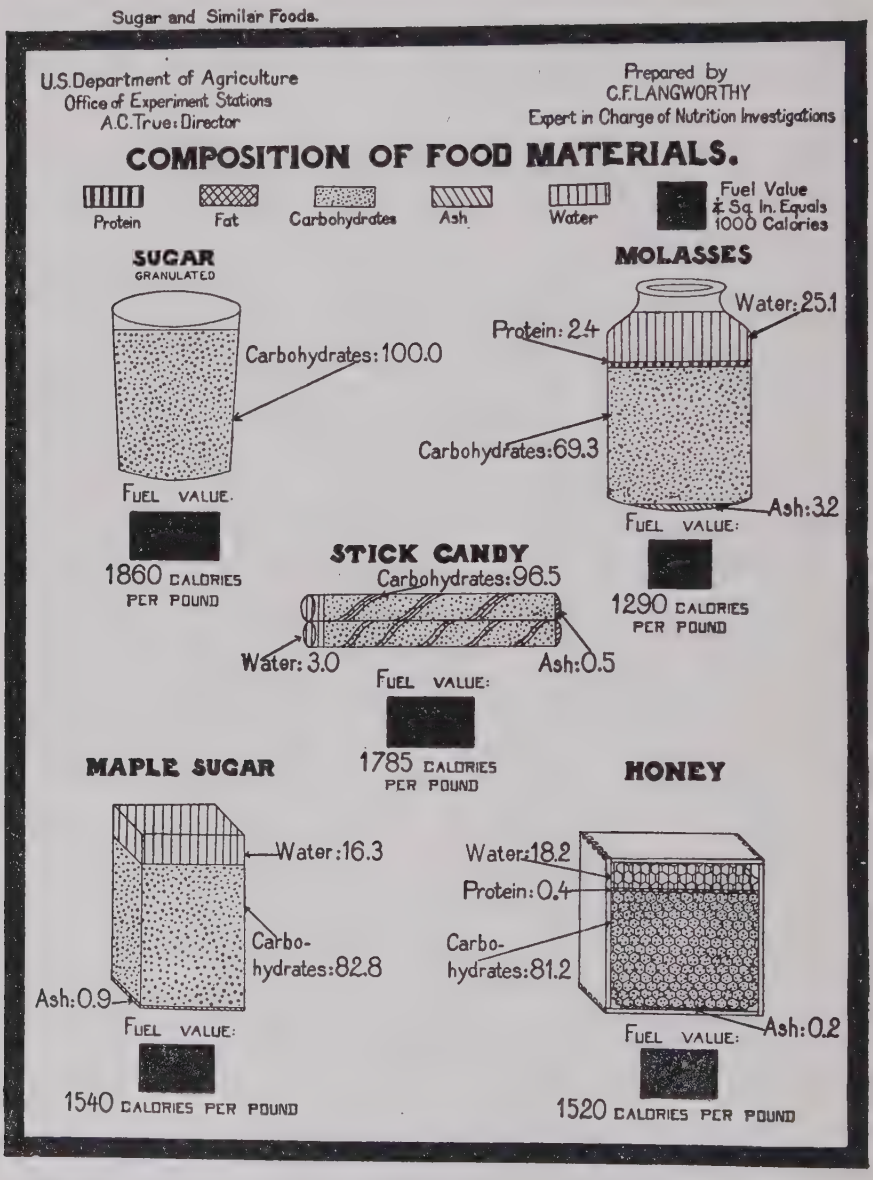


FIG. 181.

The plan of eating fruit, especially in winter, is still nearer to nature. Canning fruit and vegetables in August is better than taking aloes in December.

TOXINS IN FOODS

Scientists have extracted toxins from many different plants. From the castor bean, the source of castor oil, ricin, a violent irritant, has been obtained. But for this, castor oil would be a bland food like olive oil rather than the purgative it is. From Croton oil, crotin is had; from mushrooms, phallin. Furthermore, scientists, proceeding as they do in making tetanus and diphtheria antitoxins, have made an antitoxin to cure castor oil poisoning, and another to cure mushroom poisoning.

To those who decry antitoxins, saying that they are fantastic conceptions since, as bacteria are the products of overheated imaginations, and toxins are the imaginary products of imaginary bacteria, antitoxins are the imaginary products of the stimulation of imaginary toxins produced by imaginary bacteria, it will be a poser to be told that such vegetables as potatoes, mushrooms, peaches, and castor beans produce toxins, and that, for some of these toxins, antitoxins have been discovered. For example, snake venom is a toxin and for it antivenoms, or antitoxins, are in practical use.

In fact, toxins and antitoxins are found everywhere in nature, and bacterial toxins and antitoxins, far from being peculiar, are a part of a great nature-wide scheme.

Diphtheria antitoxin is not a new fangled conception. The old way of saying it was that we got used to a thing and, therefore, it did not affect us any longer—the same statement, but said differently.

The evidence is strong that beriberi is due to an exclusive diet of rice—probably of polished rice. We have not much beriberi in the United States, but there formerly was a good deal around Panama. Now comes a physician with an account of beriberi among the people on certain Canadian Atlantic islands—a people who are forced to live on oatmeal alone for months on a stretch. The conclusion is that beriberi comes from long continuance of a single article of vegetable diet, usually rice, occasionally oatmeal.

One of the most violent of poisons, ergot, is due to a mold or smut growing on grains of corn.

The question whether food is wholesome often depends more upon how clean, how fresh, and how well kept it is than upon commercial fabrications. Food inspectors have usually overlooked this.

The object of the above is not to cause distrust of food. Most of the safety rules for foods are known. In fact intelligent people apply them so universally that in spite of the wide separation between consumer and producer and the many things that happen in between cases of food poisoning are very infrequent.

The object of the article is to call attention to the fact that the principles underlying the use of toxins and antitoxins are not man-made. In learning to make antitoxins man has merely discovered how to do something that nature has always done. And so it is with toxins.

It would seem reasonable, therefore, to decide whether or not to use antitoxins on the merits of the case. The charges that men are serum mad,

Dietary Standards.

U.S. Department of Agriculture
Office of Experiment Stations
A. C. True, Director.

Prepared by
C. F. LANGWORTHY
Expert in charge of Nutrition Investigations

DIETARY STANDARDS.

DIETARY STANDARD FOR MAN IN FULL VIGOR AT MODERATE MUSCULAR WORK.

Condition considered	Protein	Energy
	Grams	Calories
Food as purchased	115	3,800
Food eaten	100	3,500
Food digested	95	3,200

ESTIMATED AMOUNT OF MINERAL MATTER REQUIRED PER MAN PER DAY.

	Grams		Grams
Phosphoric acid (P_2O_5)	3 to 4	Calcium oxid	0.7 to 1.0
Sulphuric acid (SO_3)	2 to 3.5	Magnesium oxid	0.3 0.5
Potassium oxid	2 to 3	Iron	0.006 to 0.012
Sodium oxid	4 to 6	Chlorin	6 to 8

FIG. 182.

toxin mad and germ mad is tommyrot. Nature points the way. They are really nature cures.

QUANTITY OF FOOD

There is a great deal of misinformation about what to eat and what not to eat from the standpoint of food values. It is true that lean meat is

rich in protein and is good for building up tissue. Starches and sugars are rich in carbohydrates and are good in furnishing energy. Vegetables, as compared with meats, are rich in carbohydrates and sugars and low in protein. Fats are rich in hydrocarbons and are especially useful in making heat. Salts are needed for nourishment, and water is needed for digestion and assimilation.

Meats are not, however, all protein, and vegetables contain a good deal of protein. It is not possible to draw a hard and fast line between the use of foods since tissue building protein can make heat, and vice versa.

A few variations have been exaggerated into all sorts of absurdities. We hear of fish as brain food, and so forth.

The fact is, it does not make much difference what food you eat. It does make a great deal of difference how much you eat. While there is something in quality, the very important point is quantity.

Almost any man can eat almost anything if he will eat it slowly and chew it very well, and then, having swallowed it, will forget about it. A period of quietude after eating will increase his latitude in things which can be eaten.

The harm which is done by eating is in the main from eating too much. Children over two years of age and men doing hard physical labor seldom eat too much.

The advice to cut down the volume of food applies to office workers, clerks, and other men and women who do not get much muscle work.

More food is required during the winter than during the summer. As the weather gets colder it is advisable to increase the quantity of food. More heat is needed and that calls for food. The colder weather stimulates one to take more exercise, and that demands more tissue building.

The advice to go on a tropical diet when the weather is tropical indicates that when the weather ceases to be tropical the proper thing to do is to change the volume and, in some measure, the kind of food to match, especially to increase the amount of fats and meat.

OVEREATING AT DINNER

The dinner meal is that in which there are most sinners. The day's work is done, and the succeeding hours are to be spent at physical ease and in a warm, comfortable room. At breakfast the man has held his appetite in check. Knowing he had work before him, that he was going out into the cold air, he has eaten lightly. He sits down to his dinner with different prospects in mind. He usually eats until his stomach is uncomfortably distended. Therefore he should know something of the food values of his evening meal.

One portion of soup—

Soup, one pint, equals 200 calories and 180 grains protein.

Chowder, one pint, equals 360 calories and 480 grains protein.

Fish, game, chicken, beef, turkey, lamb, goose, lean ham—Ordinary helping, about one-quarter pound, equals 125 to 250 calories, according to how much fat it contains, and 300 grains protein.

Butter—One pat, one-third ounce, equals 80 calories; practically no protein.
Butter beans—One-quarter pound equals 160 calories and 150 grains protein.
Green corn—Four ounces equals 100 calories and 45 grains protein.
Green peas—Four ounces equals 100 calories and 105 grains protein.
Turnips—Four ounces equals 50 calories and 30 grains protein.
Fodder vegetables and their juices, having but little food value, are asparagus, string beans, brussels sprouts, cabbage, cauliflower, celery, cucumbers, greens, spinach, lettuce, pumpkin, radish, rhubarb, tomatoes.
Apples—One-quarter pound equals 60 calories.
Raisins—One-quarter pound equals 350 calories.
Figs and prunes—One-quarter pound equals 80 calories.
Pineapple—One-quarter pound equals 40 calories.
Almonds—One-quarter pound equals 650 calories and 300 grains protein.
Pecans—One-quarter pound equals 750 calories and 150 grains protein.
Bread or rice pudding—One-quarter pound equals 175 calories and 60 grains protein.
Custard—Large cupful [8 ounces] equals 240 calories and 180 grains protein.
Cake—Large slice [one ounce] equals 85 calories and 20 grains protein.

A man needs about 2,500 calories and 800 grains protein. *Take the list given below (Food Values) and figure your breakfast.* Add about an equal amount for your lunch, and then figure your dinner from the above list. If you have eaten some article not given figure it in terms of that food most like it. Add the three together and see whether you should be getting fat or thin.

Thanksgiving Dinner.—The custom of overeating on Thanksgiving is well established. Overturning a custom is no easy matter. The comfortable thing to do is to abide by it. Maybe we can say something to lessen the burden. It may not seem a burden now, but it will about four o'clock in the afternoon of Thanksgiving day.

Drink no wine, beer, nor whisky with the meal. The stomach juice will be loaded up. Do not decrease its efficiency by diluting it with alcohol. No chemist has ever been able to mix alcohol and pepsin so as to make an efficient digestant.

Eat slowly and chew your food well. Your stomach muscle will be carrying an overload. The more work your teeth do, the less your stomach muscle will have to do.

Eat lightly of the earlier courses. By the time the meal is about half through you can form a good idea of how your stomach space is holding out, and, if you conclude you can stand more, you can make up on later courses.

Do not eat the dressing. It taxes the digestion all out of proportion to the excellence of its taste or its nutritive properties.

Drink a good deal of water during the meal. All of that food must go into solution, and water is needed.

After the dinner is over get plenty of air in the room. You will make a lot of heat in digesting that food, and you will need fresh air to get rid of that surplus heat.

An hour after dinner you will get thirsty. Drink plenty of water. It will help your stomach to digest that food and move it on into the small intestine.

Be sure to have some chewing gum on hand. I am opposed to chewing gum on the grounds that it is not esthetic and that it is not the most worth while means of whiling away the time. It should not replace gossiping, novel reading or the picture show. But it has a place on Thanksgiving day.

When you have overeaten so that you feel heavy and sleepy, when you gape and sneeze, when your stomach feels full and you unbutton your vest, then comes the time for gum. It beats pepsin a mile. In spite of what you have been told you have overfilled your stomach. For several hours the stomach muscle has labored. Overworked it shows a disposition to lag. If you will drink some water and then chew gum your discomfort will lessen. The explanation is as follows: The stomach contents were too dry, hence the help from drinking water. The stomach muscle needs stimulation; this gum-chewing supplies.

About two hours after eating go for a walk in the open air. Walk slowly for a while. After you have got well under way, begin to move faster. Do not come in until you have burned up the surplus.

If you begin to sneeze, be certain to get out into the fresh air.

Finally, if you wish to escape a bilious spell the next day, take a dose of castor oil before retiring.

FOOD VALUES

For the benefit of those who desire to regulate their diet for some one of many reasons a list of the more common foods, with their heat unit, or calorie, value is given. Much of the information is taken from Atwater's "Principles of Nutrition and Nutritive Value of Food" (Farmers' Bulletin 142, Department of Agriculture).

	Calories.
Bread, one ounce (one slice)	80
Lean bacon (one slice)	65
Small lamb chop, broiled (about one-eighth of a pound)	92
Medium size pork chop (about one-sixth of a pound)	150
Beef, one pound (five helpings)	1,000
Potato of medium size	240
Milk, one-half a pint	140
Buttermilk, one-half a pint	100
Butter, one inch cube	140
One lump of sugar (heaping teaspoonful)	40
One inch cube of American cheese	100
One teacup of mashed potato	180
One teaspoonful of cream	20
One egg	70
Peas, heaping teaspoonful (fresh or canned)	25
Beans, heaping teaspoonful (dried)	90
Apple, medium sized	60
Orange, medium sized	50
Banana	50
Dried fruit, saucerful	150
One rice croquette	150

	Calories.
One teacup bread pudding	150
Combination salad, oil dressing (one helping)	75
Vegetable soup, one portion	150
Chicken soup, one cup	60
Oyster (large), one	10
One Parker house roll	110
Cocoa (powder)	40
Chocolate (powder)	90

The average man working at moderately hard labor requires about four ounces of proteids, three ounces of fats, and eighteen ounces of carbohydrates. In the selection of a diet in order to maintain a proper food balance this relation should be approximately maintained.

Graham Lusk tells us that "it is evident that a hard working, laboring man requires 3,500 calories daily in his diet in order that he shall have fuel for the maintenance of his life and for furnishing power to accomplish his daily tasks." Those doing light, muscular work require about 2,500 calories.

Lusk gives a table of the number of calories for a family of five:

	Calories.
Father, a clerk	2,500
Mother	2,500
Son, nine years	1,250
Daughter, six years	1,000
Baby, one month	500
	7,750

Economical Dishes.—We are again told that the baby death rate depends upon the earnings of the family. This time the telling is based upon an investigation made at Montclair, New Jersey. The same story has come from so many sources that we are safe in accepting it as a fact that the largest single factor in baby death rate is the family earnings.

Money buys other things needed by a baby, but a considerable part of the baby death rate among the poor is because not enough money is spent directly and indirectly for the babies' food. But the relation between food and health embraces much more than baby food. The leading health departments in every portion of the world know that there is a relation between the food, its cost, its quantity and its quality, and health.

When it comes to personal hygiene, thousands are interested. The incomes of many are so small that they must be careful in their expenditures for food. They want to know what foods furnish ample nutrition for a small sum.

Taken as a class, pastries and desserts furnish the largest amount of energy for five cents. Analyzing forty-seven pastry orders bought at well-known moderate priced restaurants, Mr. Kephart found that five cents bought an average of 233 calories. The most economical was Napoleon—453.6 calories. The least economical was strawberry shortcake—91.8 calories. Nutri-

tion as shortcake was five times as expensive as that of Napoleon. Other classifications were as follows:

Average calories in 24 orders of beans	204.5
Average calories in 56 orders of sandwiches	180.3
Average calories in 12 orders of dairy dishes	174.4
Average calories in 87 orders of meats	174.1
Average calories in 44 orders of miscellaneous	164.7
Average calories in 6 orders of oysters	149.4
Average calories in 33 orders of eggs	140.7
Average calories in 4 orders of salads	135.9
Average calories in 17 orders of soups	116.0
Average calories in 14 orders of fruits	88.8

The most economical pastries and desserts were Napoleons, crullers, and cabinet pudding with vanilla sauce. The most expensive were strawberry shortcake, strawberry ice cream, strawberry corn starch with whipped cream, cup custard, and pineapple fruit jelly with whipped cream.

The most economical bean dishes were Boston baked beans and Boston pork and beans. The most uneconomical were Boston beans on the side and New York pork and beans.

The most economical sandwiches were roast beaf sandwich with a roll, minced ham sandwich with bread and butter, and ham sandwich with a roll. The most uneconomical were chicken sandwich, club sandwich, and hot roast beef sandwich.

The most economical dairy dishes were milk crackers and Graham crackers. The most uneconomical were the various forms of breakfast cereals.

The most economical meats were lamb croquettes with mashed potatoes, German meat cakes with French fried potatoes, and Vienna roast with French fried potatoes. The most uneconomical were deviled crabs, sirloin steak with onions, and tenderloin steak.

The most economical forms of egg dishes were plain omelet and tomato omelet. The most uneconomical were two poached eggs and chicken omelet. The omelet orders included bread and butter.

The most economical salad was potato salad. The least economical salads were crabmeat, tuna fish, and egg.

The most economical soups were beef stew and lamb stew. The least economical were tomato soup with rice, bean soup, and vegetable soup with bread and butter.

Raw oysters were very uneconomical; fried oysters and oyster pie made a better showing on account of the flour and grease added to them.

The most economical vegetables were stewed corn and creamed asparagus on toast. The least economical were sliced tomatoes and tomatoes and lettuce with dressing. The most economical fruit was baked apple with or without cream. The least economical fruits were sliced pineapple and cantaloupe.

The pastry in strawberry shortcake and other fruit and pastry dishes consists of cooked starch, a little raw starch, sugar, a fat and albumin. The berries consist of some raw starch, sugar, and two fruit acids, malic and citric. The percentage of starch in berries is about 7. Thompson gives the

proportion of sugar to acid as 4.4 to 1. The milk contains fat, sugar, and albumin. Sugar contains sugar only.

On account of the large proportion of pastry to berries the mixture is but slightly acid. The acidity is due to weak organic acids. The point I wish to make is that the acidity is not great enough nor the acids powerful enough to interfere materially with the digestion of starch. As sugars are absorbed unchanged just as they are, they do not need to be considered.

The starches must be converted into sugars before they can be absorbed. An out and out starch is called a polysaccharid. A starch halfway to sugar is called a disaccharid. The straight sugars are called monosaccharids. When starch is eaten it is first converted into a disaccharid and then into a monosaccharid, whereupon it is absorbed. Sugars, being monosaccharids, are absorbed without change.

The juices which bring about the changes in the polysaccharid starches are the saliva, the pancreatic juice, the intestinal juice, and a ferment in the interior of the cells of the intestinal wall.

The known ferments which do the work are the amylose and maltose. Amylose converts the polysaccharid into disaccharid, and the maltose changes the disaccharid into a monosaccharid.

Starches are best digested by ferments in mixtures that are weakly acid. When the acid becomes too strong starch digestion stops. When pastry is chewed saliva is mixed with it. The amylose and maltose begin to convert the starch first into maltose and then into glucose.

In the mouth little digestion occurs, as the time is too short. Digestion proceeds in the stomach until the percentage of free acid surpasses 1-10 of 1 per cent. When it reaches 2/10 of 1 per cent digestion stops.

From 5 to 25 per cent of the starch eaten is digested in the stomach, the percentage occurring in the mouth being too small to be estimated.

The work of the stomach having been finished, the food passes into the intestines. Here the starch digestion is resumed by the pancreatic and intestinal juices. These juices as starch digesters are much more powerful than is the saliva. In addition, the food is kept in contact with these ferments for several hours instead of minutes, as is the case with the saliva.

Now how do the people who hold that strawberry shortcake cannot be digested go wrong? They assume that because a strong mineral acid, muriatic, when as strong as 2/10 of 1 per cent, stops starch digestion, the weak acid of strawberries will also stop it. We make a mistake when we conclude that because muriatic acid will cause a certain effect, malic acid will do likewise; also that because a high acidity (2 per cent) will cause a certain effect, a low acidity will do likewise.

All the salivary digestion that occurs takes place in the stomach where the contents are always more acid than strawberry shortcake ever is. The greater part of starch digestion is done in the small intestine after the acid of the stomach has been neutralized. Neutralizing the acid of strawberry shortcake is child's play as compared with neutralizing the muriatic acid of the stomach juice.

If anybody tells you that breaking down the polysaccharid starch to disaccharid is done only by the saliva and that that is the difficult part of starch

digestion tell him that he does not know what he is talking about and you can prove it.

Taylor says (and there is no better authority) that the mouth is essentially an organ of trituration, not of digestion. Starch digestion is essentially a function of the small intestine and pancreas. In the presence of the master acid, that of the gastric juice, the acid of strawberries is a puling paralytic, to use the language of Colonel Watterson.

Finally, if the starch of strawberry shortcake did not digest it would be found in the feces. Examination does not show it there.

Starches digest best when the mixture is slightly acid and a fair proportion of the starch eaten is digested in the stomach in which the mixture is acid. When the free muriatic acid present equals 1 to 500 of starch, digestion stops but the starch digestion is resumed when the stomach acid has been neutralized. Most of the starch is digested in the intestine. If the intestine neutralizes the strong acid of the stomach and digests starch, where is the difficulty in neutralizing fruit acid?

In taking the position that starchy foods and fruit eaten together are not harmful, I do not overlook that some people are harmed by the combination. For several years, without much contradiction, the statement has been widely circulated that such a combination was harmful to digestion. A great many people have accepted the statement as true, because it has not been contradicted. That is the largest factor in the belief. But some people are actually harmed. Why?

In the first place some people are poisoned by fruits. This is especially true of strawberries with these people. With them it is an idiosyncrasy. They are harmed.

Some forms of fruit, especially fruit not quite ripe, contain a good deal of starch. As the fruit is eaten uncooked, the starch is raw starch. Raw starch is hard to digest. It is especially difficult for some people. The starch which fails to digest in the stomach and in the small intestine passes beyond the limits where the digestive juices are active; whereupon it is seized upon by bacteria and fermentative processes ensue.

Some harm results from eating fruit and starch by reason of the fermentation of undigested starch within the intestines.

Of more importance are the results of the digestion and absorption of more starch than the system needs—a surfeiting of the system with sugars derived from starches. One very important disease is due to too much sugar—diabetes. In this disease the kidneys eliminate the sugar from the blood.

Diabetes is not a kidney disease. One theory as to the cause of diabetes is that glucose, instead of pouring through the liver and being there changed, is poured into another set of ducts, called the lacteals, and by these is transported to a large duct which pours its contents directly into the blood. In other words that glucose has found a by-pass into the general blood stream by which it escapes the liver.

Another theory is that the liver is overwhelmed by the great amount of glucose brought to it and allows some of it to go by unchanged. There are still other theories. Whatever the theory may be, the fact is that in most cases of diabetes the body is suffering from too much sugar, the result

of the digestion of too much starch and the absorption of too much sugar from starch and other sources.

A large proportion of the people eat too much starch. Bread is thrown in, and they eat it without limit; or, having eaten a heavy meal, they eat strawberry shortcake or some fruit and starch concoction on top of it. Some of these have diabetes; more suffer in other ways.

With this group the trouble is not with the digestion of starch. The trouble is that they overeat, overdigest, and overassimilate starch and sugar.

Salt in Food.—The body of a man of average size contains about 1,500 grains, or about three ounces, of salt. This mineral forms a part of the tissues and some of it wastes with the ordinary wear of the tissues. Experimenters have found that when a man is fed on salt-free food he throws off sixty-nine grains of salt the first day, thirty-seven grains the second, twenty-two the third, and three on the thirteenth. This salt represented the wear of tissue cells of which salt was one of the ingredients.

A fasting man will excrete 150 to 200 grains of salt. The amount of salt in the excretions above these amounts represents excess of salt in the food.

Salt taken in with food goes in part to the cells to replace that lost by wear. The excess passes from the body unchanged, forming one of the ingredients of the excretions. Herbivorous animals need to get salt in addition to their ordinary food. Wild animals will not remain in a country where they cannot find salt licks. On the other hand, countries that abound in licks abound in wild animals of the grass eating kind, whenever other conditions are fair.

Meat eating wild animals do not care for outside sources of salt. They get enough salt from the blood and flesh of the kills. Cy De Vry will tell you that he salts his herbivorous, but not his carnivorous animals.

Since man eats a mixed diet he needs some salt in addition to that derived from his food supply. But Bunge is authority for the statement that, given an inch, he takes an ell. He says:

"The use of salt enables us to employ a greater variety of the earth's products as food than we could do without it."

At the same time he holds that "we are accustomed to taking far too much salt with our viands. Salt is not only an element, it is also a condiment and easily lends itself, as all such things do, to abuse."

Sherman says: "Salt equilibrium can apparently be maintained on less than one-fourth the amount of salt ordinarily eaten."

The prevailing opinion now is that when scurvy develops among people who have been living on salt meat almost alone the disease results from vegetable starvation and not from excess of salt, as was thought to be the case at one time.

When salt is eaten in excess the chemical is passed into the urine, the sweat and the bowel content without change. However, it is somewhat irritating to the cells through which it passes. Excess of salt causes the cells of the body to break down somewhat more rapidly than they normally would. It acts as an artificial whip to the kidney cells. It is bad judgment to stimulate the kidney cells continuously for years.

Table salt acts somewhat as a saline purge, as would a very small daily

dose of salts kept up for years. That, too, is bad judgment. It acts as a long-continued mild stimulant to the sweat glands. Perhaps the people who complain of night sweats or of sweating under the arms, may find a suggestion here.

No Brain Foods.—*T. J. writes to know if there is a diminishing death rate equaling the improvements in hygiene and sanitation. Does eating the livers and hearts of animals strengthen the same organs in the person eating?*

Reply.—1. The death rates are much lower than they formerly were. The Chicago death rate for 1881 was 26. That of 1911 will be under 15. Figures for the years before 1881 are not accurate enough to be taken unreservedly.

The sickness rate is less, but we cannot say how much less. About the only entire sickness figures of value are those furnished by the armies and by controlled populations such as those of the canal zone.

The best evidence of improvement was a comparison between the figures of the Japanese army in the war with Russia with those of the American armies in the Civil War, or between the United States army along the Rio Grande in 1911 and the same army in 1898.

Some people know hygiene and practice it, some know it and do not practice it, some do not know it and do not practice it.

The diminution of the rates does not keep pace with the growth of knowledge.

2. No. An idea prevails that to nourish the brain one should eat brains; to nourish the heart, eat hearts; that a nursing woman can drink milk and have it pass directly to her breast for her baby.

The idea is wrong. When brains are eaten they are broken up by digestion into new chemicals, and these are built up into new substances. These new substances have no special affinities for the brain cells of the person who has eaten brains.

The way to build up and nourish any organ is to exercise it in moderation and then to feed it food which is good along general lines. There are no brain foods, or heart foods, or kidney foods, or toe foods.

Not Blood Builders.—*E. E. M. writes: "Is it not true that carrots are blood builders; also beets? Does not corn make heat and rice build muscle? It occurs to me that physicians warn against meat as producing kidney diseases. Will you kindly enlighten me as to other foods that produce red corpuscles? Would not boneset tea (a pint a day), a good foot bath each night, and a good-sized carrot or a handful of dates to keep the liver regulated, do much to aid the system in overcoming the bacilli which give the infection of colds?"*

Reply.—1. Carrots and beets are not blood-builders.

2. Meat only produces kidney irritation when eaten in excessive quantities, and is usually only one of a number of causes.

3. The articles you name and the daily foot bath can possibly do no harm. Greater security can be gained against the various bacilli producing colds by simple living, absolute cleanliness, and up-and-about habits.

Food Value of Grapes.—*H. W. M. writes: "As many people are now eating grapes, would not a few suggestions as to their value as food and the proper way to eat them be helpful? 1. What food value does the pulp*

alone contain? 2. What food value does the skin contain? 3. Should the pulp and skin both be swallowed? 4. Should grape seeds be swallowed? 5. Is there any danger of producing appendicitis by swallowing grape seeds? 6. If there is no danger in swallowing grape seeds and grape skins, would they not be as beneficial to the bowels as eating agar?"

REPLY.—1. Has some heat value, but it is not great.

2. Practically none.

3. Yes.

4. Yes, after being chewed.

5. None if the seeds are chewed. The danger is but slight under any circumstances.

6. Eating grapes, pulp, skin, and seed, is an excellent cure for constipation.

How to Tell Butterine.—*M. B. J. writes: "Is butterine, properly and cleanly made, a wholesome and readily digestible fat? Is it inferior to butter as a food? Why should the poor man have to pay the national government 10 cents a pound tax on his fatty food in the shape of butterine, while the rich man pays the national government no tax on the butter he consumes? Is there an easy way for the housewife and cook to differentiate butter from butterine?"*

REPLY.—1. Yes.

2. No.

3. No reason except that the law requires it.

4. Yes. When butterine is vigorously boiled in a spoon it sputters and does not foam. Butter foams but does not sputter. Get Farmers' Bulletin No. 131, by Patrick, on "Household Tests for Oleomargarine and Renovated Butter."

Evaporated Milk.—*W. K. H. writes: "Please tell me if, in the evaporation of milk, any food qualities are lost. Is the evaporated milk offered in the market in cans better and safer than the milk usually sold by the milk dealer? They claim, the evaporated milk being sterilized, there are no germs left to do harm."*

REPLY.—For adults none of the qualities is lost. For babies there are certain chemical changes which make the milk not quite so well balanced a ration. It is safer, but not better. Evaporated milk is practically always germ free.

Mixed Diet Most Helpful.—*J. S. writes: "1. Is it healthy to live on vegetables and milk only?*

"2. Is there any record that such diet would prolong life?

"3. Is there any truth in the statement that people living on vegetable diet only can withstand sickness in the same degree that people eating mixed foods do?

"4. Is it possible to reduce weight by fasting thirty or forty days without injuring health?

"5. Do you consider it wise to fast until noon and eat only two meals or even only one a day?"

REPLY.—1. No. The highest opinion is that the average man thrives best on a mixed diet.

2. No. The histories of men who have lived to a great age record that they varied their diet.

3. Chittenden and others whose opinions are entitled to great weight believe that people who live on a low protein diet (generally a very small proportion of meat) resist certain diseases better than others. In certain other directions these people are less resistant.

4. Fasting for thirty or forty days to reduce weight is as foolish a procedure on the one hand as gluttony on the other. The gradual reduction of fat by the gradual reduction of food eaten is sensible.

5. No. It leads to overloading the stomach at the two meals.

No Reason for It.—*N. P. writes: "Will you kindly tell me why the eating of fresh eggs, either soft boiled or fried, act as a physic? Cream has the same effect. Is this liver or bowel trouble?"*

REPLY.—There is no reason why fresh eggs or cream should act as a physic. If you have noticed the effect described frequently and carefully enough to be certain that it is an effect and not a coincidence, it means some peculiarity in your makeup, an idiosyncrasy, or else some condition which your physician should investigate. I should rank the chances as follows: Coincidence, first; idiosyncrasy, second; condition, third.

May Eat Too Much.—*H. L. writes: "I am a healthy, strong, active young man, but for the last two weeks upon awakening in the morning I find my nose has been filled with blood. I am rather worried about this."*

REPLY.—You are getting up too much arterial tension. Probably you are eating too much. Your nosebleed helps you. It would be better, however, to prevent it by eating less and exercising more.

Bulk of Food.—*J. R. F. writes: "Does drinking moderately of tea or coffee with meals help or retard digestion? In answering one of your inquisitors you have stated that, in a great many cases, lack of bulk of food was the main cause of constipation. Do the liquids, such as tea, coffee, or water, which are consumed with the meals, help to make up this bulk?"*

REPLY.—1. Moderate drinking of tea or coffee with meals will not help or retard digestion.

2. Liquids do not increase the bulk of food in the sense meant in the answer. The bulk should be made up of vegetable and meat fiber which pass through not much changed. For example, the bran of wheat, unbolted cornmeal, the woody parts of vegetables, the rinds of fruits—substances which correspond to hay, fodder, stalks, and other forms of roughening in feeding live stock.

Bran and Agar for Human Food.—*G. W. P. writes: "Kindly tell me what kind of bran to use and how to cook it. What is agar?"*

REPLY.—Bran for human food is put up in packages. Ordinary bran, as sold in the feed store, is not so nice. It can be eaten like a cereal uncooked, but warmed, and served with cream and sugar, or it can be cooked in gems. Agar is a seaweed. Any druggist can get it for you. It comes in rough, shreddy strips. It is eaten raw. It is to be thoroughly chewed. Several handfuls can be eaten a day. It is just roughage without taste and with no food value. It acts by increasing the bulk of the intestinal content and by taking up moisture.

Buttermilk Tablets.—*R. M. H. writes: "Can you tell me anything concerning certain 'buttermilk tablets' supposed to convert sweet milk into*

buttermilk in a few hours? Where are they sold? 2. Do they make buttermilk which is wholesome?"

REPLY.—1. If you cannot obtain them from your druggist, have him get them from the manufacturers.

2. Yes.

Fresh Buttermilk Better.—*W. W. writes: "Is freshly churned buttermilk good for the health? Is it as good as buttermilk which is tart?"*

REPLY.—The name buttermilk is given to the milk left after churning. Most of the reputation of buttermilk is due to the fresh buttermilk just out of the churn.

Those who live in the country we advise to stick to freshly churned buttermilk. The same advice is given those who live in the city and know where and how to get this kind of buttermilk.

Buttermilk made from the churning of sweet cream is better than that made by churning sour cream.

Buttermilk.—*F. H. H. writes: "Can you tell me something about Chicago buttermilk? I get it at the downtown fountains. It looks and tastes like buttermilk of the country with small clots of butter showing in it. It agrees with me. I order buttermilk of my milkman—one of the largest dealers in the city—and I get something very thick and sour and so white that it looks like a mixture of chalk and water. It does not separate on standing as does buttermilk from the churn. I cannot digest it. An employee of a milk concern told me it was made of skimmed milk and everything else that was left over. Most doctors recommend buttermilk as a summer drink—a little information from you as to the different varieties offered I know would be welcomed by many."*

REPLY.—We might divide buttermilks, in a rough way, into three kinds —old-fashioned churn buttermilk, culture buttermilk, and ordinary market buttermilk. The old-fashioned churn buttermilk had more of the fat left in and was usually consumed when it was fresh. Most people like it best of all and I think it probably was and is the most wholesome kind. If you can get it made in the city from a good grade of milk it is the best for you. Be careful that it is not churned from left-over job-lot milk. You must trust to the honesty of a high-grade merchant on that point. Don't buy from any Tom, Dick, or Harry just because you see it churned. He may be feeding the churn with aged milk.

Culture buttermilk is made from pasteurized milk to which a laboratory culture of lactic acid bacillus has been added. It is smoother than the other sort, but it generally does not taste as well. When it gets old it sours as does any buttermilk. It is the second best kind and it is the safest kind.

Ordinary market buttermilk may be made from raw or pasteurized milk. The lactic acid germs in it have fallen in from the air, mostly from the stable air. When it gets old it sours. All buttermilk "wheys out" as it ages, some quicker, some slower. It is a bad sign rather than a good one. Buttermilk is much the best summer drink. In hot weather it beats sweet milk a mile and beer ten miles. But there is more difference in the flavor and wholesomeness and nearly as much difference in safety in buttermilks as there is in sweet milks. Be careful to get good buttermilk in good condition from a good dealer.

Colored Butter.—*E. K. C. writes: "Is annatto coloring in butter prohibited by law? If not, is it objectionable?"*

Reply.—It is not prohibited by law. From the health standpoint it is not objectionable. It is the cleanest ingredient of butter. Commercially, of course, it is a means of fabrication, of making a poorer article look like a better article. Many of the most expensive hotels and restaurants now sell uncolored butter, giving the customer a chance to judge whether it is good or not. Probably, in time, this form of fabrication will go the way that commercial frauds seem to be headed.

Bran Gems.—*A correspondent sends in the following recipe for bran gems, which, she says, have proved efficacious in cases of constipation of long standing:*

Two cups of clean wheat bran, a little salt, one cup of graham flour, one cup of sour or buttermilk, one teaspoonful of baking soda, six tablespoonfuls of molasses. Add chopped figs or raisins to taste. Mix thoroughly and bake in gem pans twenty or twenty-five minutes. This quantity should make not more than twelve nor less than eight gems. Eat one, two, or three a day, as necessary.

Baked Beans Good Food.—*A reader from Crown Point, Ind., writes: "Should foods that are difficult to digest, such as baked beans, be included in the diet of the ordinary person? Or should the diet consist entirely of easily digested foods? Is it possible for a person to chew his food too much?"*

Reply.—1. Baked beans is a good food, easily digested and highly nutritious. Anyone with whom it disagrees should leave it off his bill of fare.

2. Practically, no; theoretically, yes.

Dried Fruits.—*E. N. writes: "1. Do dry fruits tend to cause constipation? A doctor advised one troubled with constipation to avoid dry fruits. Would you so advise? 2. Why is whole wheat flour more healthful than fine white flour?"*

Reply.—1. No. If you cannot get plenty of fresh fruit eat an abundance of dry fruit. Keep it up until May.

2. Has more bran in it.

Value of Oysters.—*C. S. P. writes: "In making an oyster stew what is the minimum amount of heat required to render the oysters safe from any danger of infection? Why are oysters so insipid and tasteless as compared with a few years ago? What is their food value, by weight, as compared with lean beef or milk?"*

Reply.—1. A temperature of 120° continued for twenty minutes will kill the typhoid germ that may be found in oysters.

2. The taste and succulence of oysters depends upon the kind, quality, and quantity eaten. After eating a considerable quantity of oysters, at frequent intervals, the relish for them is lessened, and the palate perhaps is not so appreciative. We have not heard anyone else complain that oysters are more insipid than they formerly were. Maybe you have been unlucky in getting tasty ones.

3. A pound of oysters in shell has a fuel value as food of 235 calories.

A pound of lean beef of the various cuts has an average fuel value as food of about 850 calories.

Candy Concentrated Food.—*W. G. writes: "Would a bar of chocolate a day injure me in any way? What benefit is candy to a person?"*

REPLY.—1. No.

2. Candy is concentrated food, particularly heat-making food. It is bad for diabetics, and also for those who are overfat. If a man has trouble in keeping from overeating, a little candy half an hour before eating will take some appetite away. Banquets arranged on a gormandizing basis would do less harm if candy, instead of cocktails, were served fifteen minutes before each meal.

Cottonseed Meal.—*R. S. H. writes: "I have been informed that cottonseed meal is prepared the same as evaporated corn. The seed is first steamed for an hour under pressure of 120 pounds to remove the phosphoric acid and soften the hulls. Then it is thoroughly dried by being heated with air passing over pipes at a temperature of 350 degrees. It takes about half an hour of this treatment, and, when cool, the seed can be ground into meal. There is another plant which has a very high protein content which makes an excellent soup or salad. It is the kudzu vine, which grows on thousands of porches through the Middle West. As it carries as much protein as beef, or mutton, or chicken, it can be used as soup stock, and in salad will take the place of chicken. Five cents' worth of seed will supply a family with all the plants needed for the summer's use, and, if the leaves and stems are cured and stored in the attic, they can be used all winter for soup stock or with potatoes and onions as a salad. It is a Japanese plant and is said to have carried the Japs through several severe famines during the last few centuries. In the hot moist summers of the gulf states it grows with remarkable rapidity and is extensively used as pasture for stock; but it is too valuable for stock feed at this time, when there is such a scarcity of protein in the food the poor are forced to consume."*

REPLY.—The literature on cottonseed meal and flour which has recently come to my attention advises the use of four parts ordinary meal to one part of the cottonseed product. Cottonseed products are of great nutritional value, and it is to be hoped that the objections to them as such have been removed.

Cottonseed Oil Nutritive.—*F. E. C. writes: "Is there any nutritive value to cottonseed oil? The magazines say so much about the adulteration of olive oil with this product that it has raised a lively curiosity in my mind. I priced a registered brand of olive oil, and it was 95 cents a quart; then asked for cottonseed oil and was shown a bottle labeled salad oil. This was 35 cents. Do you recommend olive oil as a part of the daily diet of ordinary people or is it for special cases only?"*

REPLY.—1. Cottonseed oil is just as nutritious as olive oil, but lacks the fine flavor of the latter.

2. Olive oil, as usually found on the market, is most always adulterated, containing cottonseed oil. The fraud in this instance is more of an economic and moral issue. It is put up in fancy bottles with gaudy labels and sold as imported. The bad French sometimes displayed

on the labels frequently testifies to the adulteration of the domestic product.

3. Olive oil may be used as a part of the daily diet with salads.

Foodstuffs.—*J. W. C. of Utah writes: "Nature has provided many ways of keeping well, and probably if all its laws were strictly observed as to body and mind, there would be less work for the doctors. It is said various foods, both animal and vegetable, contain certain chemical elements which are necessary to good health and proper functional operations of the human body. Whether this is true or not I know not. I know that asparagus gives a very decided odor to the urine, whether beneficial or not I cannot say. Fish has been said to provide brain food and strawberries and lettuce iron. I have understood that administration of lime in some form or other to growing children improves their bones. What I would like especially to know is whether there is anything administered either as a medicine or through elimination from foodstuffs which will retard to any considerable extent the decay or diminution of usual functions of the bones with regard to the nerves; and if so, I would like to know what it is and how administered. In other words, to keep the bones in the condition they are at 50 years of age in status quo as long as possible. The bones of some are O. K. at 80 to 90 years."*

REPLY.—I think it is definitely proved that the claims that certain foods feed certain organs and that by giving certain foods you stimulate the growth or function of certain organs are fallacious. The men who advertise to do these things are quacks. In fact, people having become too intelligent for the old style quackery, the born quacks are exploiting this field.

This matter of bone foods lends itself to investigation. Stock men have tried it from every angle and they have found there is nothing in it. Of course, absolute lime starvation results in harm, but a certain minimum quantity of assimilable lime having been reached any changes made above that make no difference either way.

Another field thoroughly explored by the stock men is that of foods to produce milk, particularly cow's milk. What counts is the cow—her inheritance, her digestion, and her health. If she is starved, her milk product suffers with her other functions but, given enough food of proper balance and easy of digestion, her milk is not influenced by varying the articles therein. There are no brain foods or bone foods.

Water at Meals.—*I. writes: "Will you kindly publish the name of a good book on diet, something concise? What is the latest conclusion as to eating meat? I notice you advise drinking water between meals. What ill effect is there from drinking a pint [two glasses] per meal? What advantage is there in refraining from this and drinking between meals?"*

REPLY.—1. "The Fundamental Basis of Nutrition," by Lusk; price, 50 cents.

2. There is no general conclusion, and there is no machinery for arriving at any. Some writers hold one way and some another. The subject is handled well by Lusk.

3. A moderate amount of fluids with meals does no harm; it does good. Too much retards digestion by overdistending the stomach and overdiluting the gastric juice. One pint is not too much.

Tomatoes Not Harmful.—*C. P. J. writes: "I have read that tomatoes contain oxalic acid; that they destroy the iron in the blood, and leave the system a prey to rheumatism. I have also read that they contain calomel and should not be eaten to excess. Which is correct? Is it a fact that strawberries are indigestible and unfit for food?"*

Reply.—Someone has given you much misinformation. Tomatoes do not contain any harmful chemical substance. They do not cause rheumatism or destroy the iron in the blood. Strawberries are not indigestible. They are not unfit for food.

No article of diet should be eaten to excess. Some people cannot digest strawberries. Some are poisoned by tomatoes. But the same may be said of milk, eggs, and meat.

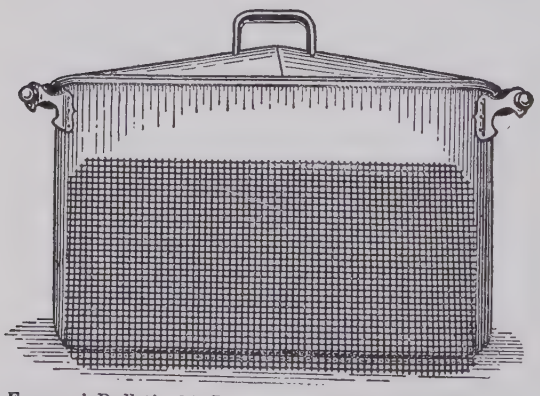
Fruit Acids Weak.—*M. T. D. writes: "The statement is made that oranges, four to six a day, neutralize the effects of heavy smoking. Do you agree? It is also said that a whole grapefruit, eaten in the morning, will have a tendency to promote indigestion as to other foods eaten at the same meal, on account of the large amount of acids contained in the fruit. Will you kindly give your opinion?"*

Reply.—1. No.

2. Do not agree. The stomach secretion contains a much stronger acid than that contained in grapefruit. Fruit and vegetable acids are weak acids and are quickly changed into substances other than acids.

FOOD PRESERVATION

On one occasion Woodrow Wilson, then a candidate for president, gave an opinion on the benzoate question. It will be remembered that Dr. Wiley, making use of a poison squad, had decided that a small dose of benzoate of soda eaten each day with the food was harmful. Presidents Roosevelt and Taft had not indorsed the opinion of Dr. Wiley as he felt they should and he was attacking them. Thus benzoate became a matter of enough interest to demand an opinion from a candidate for the presidency.



Farmers' Bulletin 34, Dept. of Agriculture.

Fig. 183.—For Sterilizing by Heat, as in Canning Tomatoes.

Mr. Wilson said that he was opposed to the use of benzoate in food whether Dr. Wiley was right or wrong. His reason was that by using benzoate spoiled or overripe products could be preserved and the consumer would be harmed by them.

This statement opens up the entire question of preservatives. The same argument has been used against refrigeration. It has been asserted

that some of those who opposed preserving with benzoate were preserving with peppers and spices, and that these substances not only are more harmful than benzoate but also are better preservatives, and therefore permit the use of even worse foods—an important point and an interesting one, especially as women have always used spices to preserve with.

Professors Hoffman and Evans of the University of Wisconsin have spent some time trying to find out whether spices will preserve and how they compare with benzoate. They found ginger, black pepper, and cayenne of no service. Nutmeg and allspice have some preserving power, but not much.

Cinnamon, cloves, and mustard are fine preservatives—even better than benzoate. Cinnamon and mustard would preserve even when the amount present did not change the taste much. They took some spoiled tomato catchup and tried the relative powers of cinnamon, mustard, and benzoate to stop further spoiling in it. They found cinnamon the best, mustard next, while benzoate acid was much the least efficient.

Now, if the manufacturers want to go to school they can learn the art of preserving with cinnamon and mustard from the women folks who practiced it long before anybody ever heard of benzoate.

It is clear that there are many methods of preserving foodstuffs. Refrigeration is one; sterilizing and canning another. Among the chemical methods are preservation of meat with salt, of hams by cures, of corned beef with pickle, of dried beef with smoke, of tomatoes with spices and oils, and other foods with benzoate, and still others with boracic acid. Any one of them will permit the use of foods that are overripe in some sense.

What are we going to do about it? I cannot see any other way out of it except a national licensing system, with inspectors in every food factory. The duty of the inspectors will be to pass on the wholesomeness of products that are to be preserved, embalmed, or refrigerated.

REFRIGERATION

In ten years the rural population of the United States increased 4,000,000, the city population 12,000,000. In Canada the increases were 500,000 and 1,200,000 respectively.

"This movement cityward," Dr. Mary E. Pennington of the government service says, "makes development of the art of refrigeration a necessity."

Dr. Pennington has been studying market eggs all over America for several years and when she speaks on the subject the wise housewife will listen. The woman who lives close enough to the farm to hear the roosters crow and the hens cackle will get the best by using fresh eggs for ten months in the year. The rest of the world had better eat refrigerated eggs.

The amount of faking in the fresh egg business makes the wooden nutmeg business look amateurish. Even on the farm, July and August "fresh eggs" are frequently "bum." The mowing machine frequently uncovers many an undated nest. In addition, unchilled eggs deteriorate rapidly in the summer heat.

Dr. Pennington says: "We have traced eggs less than twenty-four hours old, shipped by express in a hot car nineteen hours, and found them lower in quality when they reached the market than fresh eggs shipped for a six day haul in a refrigerator car."

And elsewhere—"The summer egg, as it comes now to the packing house, is at best a very unsatisfactory product to ship on long hauls. More and more one finds the packer who is supplied with refrigerator rooms holding back a few carloads of late May or early June eggs to be sent to his clamoring customers in August or September when the egg supply is the worst of the whole year and when the highest grade eggs on the market are those cold stored in the early spring."

Eggs begin to go stale immediately upon being laid. The rate of deterioration depends upon the temperature at which they are kept, and in some measure upon how well they were cleaned immediately upon being gathered. *The warm pantry of the farmer's wife, the hot store of the country merchant, the hot ride in a hot car, the hot places in which they are kept in the city, all suffice to cause a loss of 10 per cent before the eggs get to the customers.* Of course, they go stale continuously after they get to the kitchen, unless they are kept in the refrigerator. This 10 per cent loss referred to only means the loss from decomposed eggs. The loss of freshness of taste cannot be computed.

When the farmer gathers eggs they should be chilled to as near 40° as they can be. As soon as possible they should be placed in a moist, ventilated, chill room held at 40°. They should go to market in a refrigerator car, iced but not salted.

If they are not chilled before shipping it will take four or five days to reduce the egg temperature to the car temperature. All the while deterioration is going on. They should be held at 40° in the stores. Eggs handled in this way will keep for nine months and may even keep longer. Such eggs in the city will average better than city fresh eggs.

COLD STORAGE

At one of its meetings not long ago the American Public Health Association received a report from its committee on cold storage. At the same meeting Professor Barnard read a paper on "Cold Storage in Relation to the Food Supply" in the course of which he indicated the nature of a report to be made to the National Association of Food Officials by a committee appointed to draft a model cold storage bill.

I think the conclusion is justified that these two organizations, national in scope and composed of men and women of character and standing, are in favor of cold storage under proper regulation. Their ideas as to regulation are set forth in the report of the public health committee.

The first three articles of this report I omit, as they do nothing but define "Cold Storage," "Cold Storage Buildings," and "Articles of Food." The others follow:

"4. No article of food should be placed in cold storage which is not mature, fresh, free from disease, or deterioration of any kind.

"5. It is essential that all foods possessing a temperature favoring some degree of deterioration should be cooled to a proper temperature as rapidly as possible with a view to maintaining it in its natural condition of freshness.

"6. After placing in cold storage it is essential to successful storage that the temperature and humidity found best for each particular food be maintained as evenly as possible.

"7. It is further essential that with certain types of food products circulation of air be maintained in the cold storage warehouse, and that an adequate amount of fresh cooled air be introduced each twenty-four hours; or, that the circulating air be passed through some solution depriving it of the volatile emanations of food.

"8. Every storage warehouse should be constructed of such materials as will not cause organic emanations and in such a manner as will facilitate maintenance in as good sanitary condition as maintained in the most modern plant employing the most modern methods for the preparation and handling of perishable food products.

"9. The periods of time during which food products should be allowed to remain in cold storage should depend upon their original freshness of condition, the continued maintenance of their optimum cold storage conditions, and on the results of further investigations on each class of food products.

"10. It is desirable that frozen cold storage food products be raised gradually to higher temperatures varying according to the size and nature of the article of food in order to preserve the tissues in their natural condition.

"11. Articles of food should not be returned to cold storage which have once been released and raised to materially higher temperatures. When it becomes necessary to transfer food products from one cold storage warehouse to another the temperature should not be allowed to rise to a point favoring deterioration.

"12. In order both to maintain cold storage foods in the best condition possible and to preserve the credit of cold storage methods it is essential that municipal control of foods placed in retail stores for consumption be of the most practical and scientific character."

CONTROL OF COLD STORAGE

Cold storage is a public servant. Like the railroads, it gets the producer and consumer within reach of each other. Like the railroads, it makes new producers for consumers and new consumers for producers. Also (but to a much greater extent than the railroads) it scrambles the seasons. It carries winter foods to the people who need them in summer; it administers summer foods to those who in winter are liable to develop ills by reason of the want of them.

Like the railroads, cold storage needs regulating. When the proposition to regulate railroads was suggested, the railroads were not anxious to have the proposal succeed. The cold storage people have shown no great anxiety for regulation. The railroads now do not oppose some regulation, and some railroad officials want even more railroad regulation than now

prevails. Eventually, the cold storage people will ask more regulation than governments will feel like giving. Many railroads were subsidized. Canada and Argentina are subsidizing certain of the cold storage equipments of their country.

So much for the industry side of the question.

Sedgwick of the Massachusetts Institute of Technology comes out strongly for cold storage from the health standpoint. He says:

"I believe that by cold storage today, rightly supervised by boards of health, as it should be, the public health has been and will be immensely promoted."

To the use of cold storage food Sedgwick ascribes much of the credit for the practical disappearance of scurvy.

"In the past, without cold storage, the public health was endangered by the temptation to use food that had not been properly kept and by the lack of sufficient variety at certain seasons."

Professor Barnard, food and drug commissioner of Indiana, agrees with Professor Sedgwick. However, he is anxious that cold storage laws should not pass until pure food and sanitary food laws are in efficient operation. He says: "The committee of the National Association of Food Officials is unanimous in its belief that cold storage legislation should not antedate pure food and sanitary food legislation, but rather should follow and supplement it."

ICE BOX ODORS

The ordinary household ice box is usually neglected. People proceed upon the theory that the temperature of the ice box being low everything about it will be sanitary and healthful. There is truth in this opinion, but the little truth in it is overworked. Food will spoil in an ice box but the spoiling proceeds more slowly than at room temperature—so slowly, in fact, that the food is usually consumed before spoiling time has come around. Nevertheless, food absorbs ice box odors and, although that does no harm, it does no good, and nobody relishes the idea. As a rule, ice boxes smell or can be smelled. Sometimes the former way of putting it better expresses the aggressiveness of the odor.

Ice box drain water has a temperature of 35° to 55°, and slimes, molds, and some bacteria grow well at that temperature. The jellylike masses of slime commonly found in the refrigerator drain is a vegetable, low temperature growth. The odor from this cold water growth goes into the refrigerator. Sometimes refrigerator drains are connected, without traps, with the sewers and sewer odors travel up the pipes to the refrigerator.

In addition, the slow bacterial and chemical changes in cold food generate odorous gases. In the ordinary household refrigerator these gases flow out when the door is opened. In the large business establishment refrigerator, door ventilation is far from being enough. Their refrigerators never smell perfectly sweet.

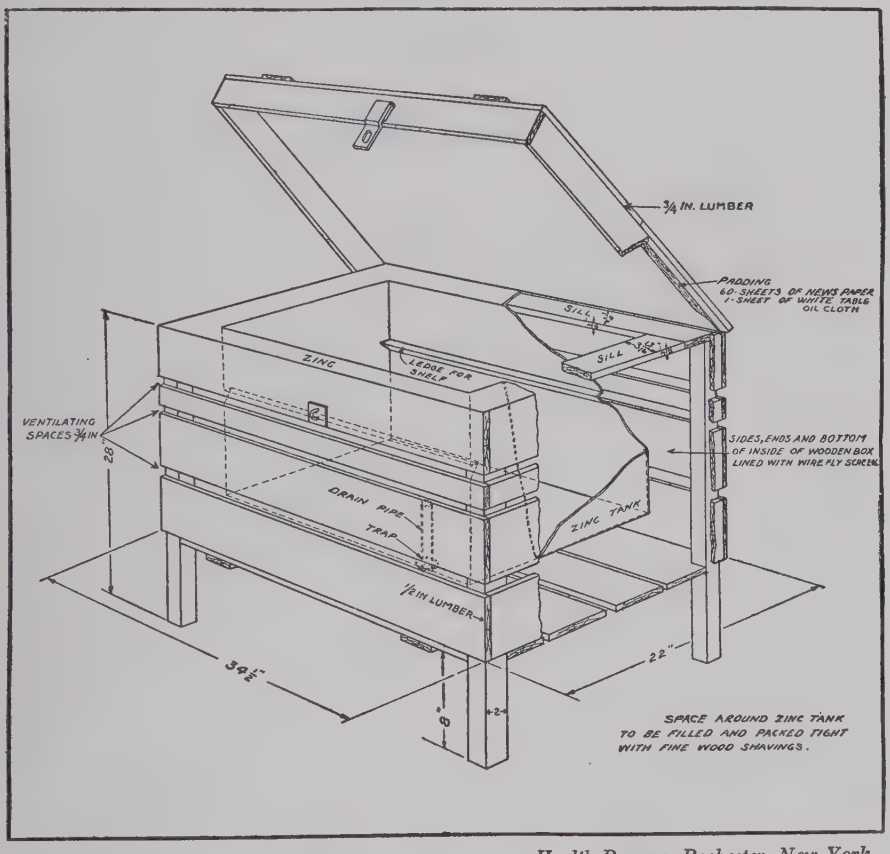
But the reader is more interested in the cure.

The cure for slime in the drains is to rod them out, wash them out with ammonia, and then with a chlorinated lime wash.

The washing must be done periodically since nothing prevents the slime from growing.

The remedy for the odors in the refrigerator proper is periodic airing and sunning. Antiseptic and deodorizing washes only temporize. Once every so often the entire outfit must be thoroughly washed out with ammonia water or soap and water, dried, and then so placed that the sun can shine into the interior for several hours.

If the household has no ice box, one can be made from a soap box, a tin



Health Bureau, Rochester, New York.

Fig. 184.—Rochester Homemade Ice Box.

can, a few newspapers, and some sawdust. To make this homemade ice box follow these directions:

Take a soap box or fruit packing case. In this is placed a tin pail surrounded with a sheet of tin bent in circular form which makes an air space. Between this and the walls of the box pack sawdust. Place a pail in the circular chamber, place the milk bottle in the pail and pack ice round the bottle. Fold a dozen thicknesses of newspaper the size of the box and place over top with the lid. The cost for ice for a box of this kind would be but a few cents a day and will keep the baby's milk cool. The box as here

suggested is practically that known as the Hess ice box, and is furnished by the Department of Health, New York City.

The Chicago Health Department gives away a "Save the Baby" circular in which are directions for making this ice box, directions for home pasteurizing milk and a great deal more of valuable information.

Refrigeration.—*J. K. A. writes: "1. Is one and a quarter inches of granulated cork enough insulation in a refrigerator?*

"2. What should be the temperature in a first-class refrigerator?

"3. What sort of insulation is best?

"4. Which is the better, a refrigerator made of metal or one made of wood?

"5. What lining is best?"

REPLY.—1. No. Three inches is little enough; four is better.

2. 45° or under.

3. Corkboard.

4. Metal is a better heat conductor than wood. A metal refrigerator will require more insulation than one of wood.

5. The lining should be metal, porcelain, glass, enamel, or some other easily cleaned, dirt-showing substance.

To Cleanse Refrigerator.—*M. writes: "My refrigerator has an odor, although I think I keep it clean. Can you tell me how to get rid of the odor?"*

REPLY.—Empty and scrub all parts inside with soap and water. Then sprinkle with chlorid of lime and add enough water to make a paste. Scrub thoroughly with this paste and then rinse thoroughly with boiling water. Put some of the chlorid of lime in the pipes and pour some boiling water through them. Then leave open for twenty-four hours, sunning if possible.

CHAPTER XXIX

Milk

COW'S MILK

Cow's milk enters largely into the food supply of the present day. Its products—butter and cheese, condensed milk, malted milk, and ice cream—are among the staples. It is used in the culinary department of every household in many ways. Its most important use as a food is in the raw state and especially by children.

Any criticism that applies to raw milk as a food for children applies also to adults but in lesser degree for with adults it rarely is the sole article of diet at any meal and in any evil event adults are better able to withstand the harm it may do than children are.

It is claimed for cow's milk that it is a natural human food; that it contains the necessary elements of nourishment; and that it is easily digested and is especially commended in the diet of children.

These ideas of milk gained currency in the days when practically everybody kept his own cows, when the milk was obtained twice every day and was consumed while it was fresh. It was not then necessary that any of it should be more than twelve hours old and much of it could be used before it was two hours old.

City dwellers rarely get their milk now before it is twenty-four hours old. Some of it is not used before it is seventy-two hours old and sometimes it is still older.

Nature provides that milk go direct from the mother to the offspring without exposure to the air or to any contamination and without change of temperature; and it may be laid down as an elementary principle that the nearer we keep to nature and its methods the nearer we are to being right.

Bacteria grow and multiply in cow's milk at room temperature with great rapidity. In addition to the filth bacteria of the barnyard, milk may become infected with the germs of contagious disease.

The older the milk the greater has become the increase of the infection; and the larger the dose of such infection the more certain is the development of the disease in the victim who drinks it and naturally the more virulent the attack will be.

If the milk be consumed within a few hours after the milking time and before any germ has had time to multiply the disease may be escaped; or if contracted the chance of recovery will be greatly increased.

Epidemics of typhoid fever and scarlet fever have been traced directly to the milk supply where persons suffering from these diseases handled the milk and infected it at the dairy.

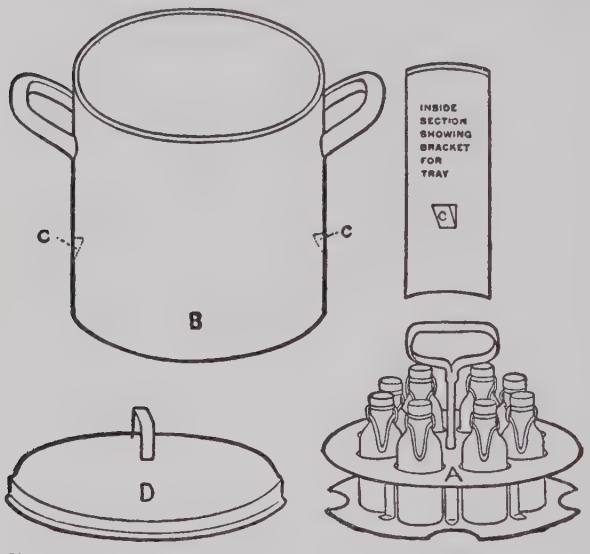
Cow's milk begins to deteriorate as to its digestibility and wholesomeness from the moment it has been exposed to the air. Under the best methods of production it has caught up from the air from 300 to 1,000 bacteria to each teaspoonful. In twenty-four hours, unless checked by cold, they have multiplied to 1,000,000 or even more to the teaspoonful.

Many of these germs are the bacteria of stable manure and when taken in large numbers are irritating to the stomach and intestines of infants.

They cause vomiting and diarrhea, a disease of children which is commonly called "summer complaint." It is highly fatal in hot summer weather and occurs in the bottle-fed more or less all through the year.

AGE OF MILK

For six hours after cow's milk is drawn bacteria do not grow readily in it, which indicates that until it is six hours old it has some power to retard the growth of germs. After milk is six hours old the bacteria multiply hour by hour in increasing ratio until it becomes sour.



New York Health Dept.

Fig. 185.—Straus Home Pasteurizer.

The exact age at which milk becomes sour to the taste depends upon the amount of dirt bacteria that get into it at milking and its temperature.

In summer heat it may sour within twenty-four hours. If it is clean to start with and if it is speedily reduced in temperature to 50° Fahrenheit or below and constantly kept at that temperature it will keep from souring for several days.

It must, however, be kept in mind that long before it is sour to the taste it is dangerous for children's diet. As the uncountable generations of bacteria multiply, live, and die they consume much of the nutrient principle of the milk and leave the useless, if not toxic, properties of their dead still in the milk.

Such milk is less nourishing for adults and to expect a child, with its delicate digestion, to thrive when fed with it is wholly irrational.

As milk stands the cream rises and it can never again be mixed as completely as it was originally. This is an additional reason for using it fresh.

Consumers of milk must learn that poor milk or cheap milk is worth nothing as an article of diet. It is even worth less than nothing for it certainly will disarrange a delicate stomach while new, fresh milk produced under clean conditions from healthy cows is of priceless value if used as an article of diet for the young.

Six-hour-old milk is worth very much more than twelve-hour milk. Twelve-hour milk is worth double that of forty-eight-hour milk; while milk more than forty-eight hours old is not fit diet for children except that it be produced and constantly kept under the most favorable conditions.

AS INFANT DIET

Milk in nature is infant diet only. Not alone is this true of man but throughout the animal kingdom. As the young grow the teeth appear and they should be used on solid food. Liquid food may be a useful adjunct but it should not predominate.

Physicians sometimes prescribe milk for adults; but it may be pointed out that in patients sick with typhoid fever (where a milk diet has had its greatest vogue with physicians) the infant conditions in some particulars are again set up—the patient is helpless and partakes of no other food.

Even in the treatment of this disease medical opinion is changing and milk as a sole diet has fewer advocates than formerly.

Milk is repugnant to many people and often is quite indigestible in both young and old even at its best.

MILK PRODUCTION

As a substitute for mother's milk in the feeding of infants fresh pure cow's milk modified in strength to suit each child stands at the head of the list of infant foods. For this reason the character of a city's milk supply is of vital importance and every effort should be put forth to reduce the hours between the milking time in the country and the time of delivery to the consumer in the city.

In modern dairies the cows are almost wholly stall-fed all through the year. They are permitted to graze as a rule for two or three months in the year, but dairymen do not attach much importance to the value of grass as food for milk cows.

The balance of the year the cows are stall-fed and are turned into a paddock every day for air and exercise—and this seems to answer every purpose.

There is a growing feeling among dairymen that grazing is not advantageous to the herd from the food standpoint and that grazing is the least profitable use for arable land.

If it ultimately be demonstrated that cows can get along healthfully without grazing the dairies may be moved nearer to or even within the limits of the city.

If this were done it would permit of delivery to consumers twice a day. Milk then would never be more than twelve hours old and it would permit of delivery within three or four hours of the time of milking.

MILK TRANSPORTATION

The milk of cities is produced mostly within a radius of fifty miles. The milk of the night before and that of the morning are brought to the railroad station in the forenoon.

MOTHER'S MILK FOR MOTHER'S BABE
COW'S MILK FOR CALVES
(God's Plan)
The Long
vs.
The Short Haul
70 percent of city babies get their food through a tube 60 miles long.
It takes about 36 hours—often 42 hours—for the milk to run from the cow end of the tube to the baby end of the tube.
This tube is open in many places and baby's food is frequently polluted. It is often wrongly kept in overheated places.
Then there may be a diseased cow at the country end of the tube.
And Yet Some People Wonder Why So Many Babies Die!
On the other hand the mother-fed baby gets its milk fresh, pure and healthful—no germs can get into it.
To Lessen Baby Deaths Let Us Have More Mother-Fed Babies.
You can't improve on God's plan.
For Your Baby's Sake—Nurse It!
MILKTOWN
FRESH MILK
FRESH MILK CO. DEPOT
MILK SPECIAL

Chicago Health Departmen

FIG. 186.

The milk reaches the city between noon and three or four o'clock in the afternoon and is delivered to the consumer the following morning.

Half of the milk, then, is twenty-four hours old and half thirty-six hours old before it reaches the consumer and, as there is but one delivery a day, half of the milk is forty-eight hours old and half is sixty hours old before it is used and before the next delivery is made.

Such delay in shipping milk so short a distance is unpardonable in this day and age and it is death to the babies.

Shipping milk by steam railroads is altogether too clumsy a method. Electric lines could do better. They can make as much speed while running as the steam roads and by running over the city's system of passenger transportation they could deliver the milk at widely distributed points in the city.

While the electric lines were hauling milk they could haul in addition eggs and garden truck and other things that are only at their best when fresh.

CITY DELIVERY OF MILK

So long as there is but one delivery of milk a day from the country there is not much sense in hauling milk twice a day to the consumer. The milkman properly argues that there is no gain in bringing back to the consumer the same milk that he had at his door in the morning.

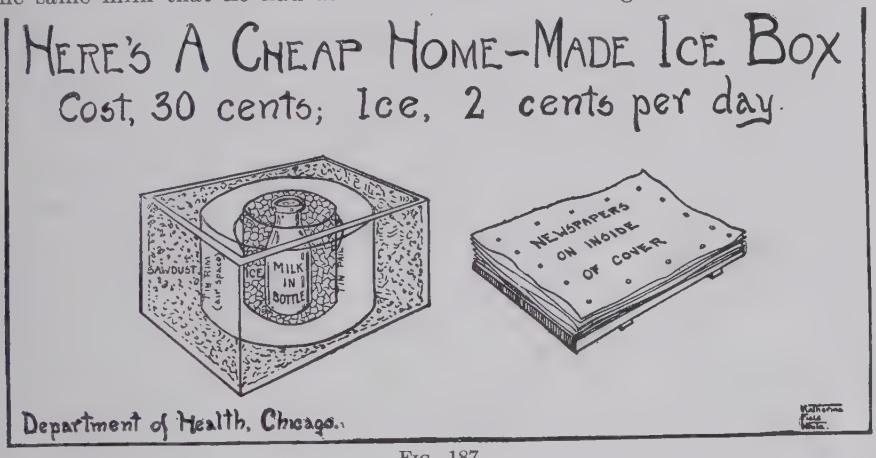

HERE'S A CHEAP HOME-MADE ICE BOX
Cost, 30 cents; Ice, 2 cents per day.
SAWDUST
ICE
MILK IN BOTTLE
NEWSPAPERS ON INSIDE OF COVER
Department of Health, Chicago.

FIG. 187.

His argument cannot be disputed when the consumer owns an ice box, but it is another story in the homes of the poor who cannot afford the luxury of an ice box. A twelve-hour supply cannot be cared for without ice during the hot months of the summer.

If we are to have but one delivery a day why not have the milk delivered in the evening instead of in the morning? That would put the milk into the hands of mothers twelve hours earlier and add mightily to the chances of the babies.

It would have other advantages. The delivery wagons in large cities now start upon their routes at the unearthly hour of two o'clock in the morning and are through in time to go to the railroad station to remove the fresh

supply from the cars and haul it to the depots of the dealer. Everybody then rests while the milk goes on aging until the following morning.

It would be more sensible to deliver the milk in the afternoon and evening when the household is awake to take care of it instead of putting it on the doorstep at two, three, four, and five o'clock in the morning to freeze and break in the wintertime or sizzle and rot in the morning sun of the summer.

It would be worth something to the sick, suffering, and sleepless ones to be rid of the noise of the rattling wagons in the early morning hours.

One naturally wonders why the delivery wagons should not meet the trains at the depot when they arrive from the country and start at once with the milk to the consumer. Why should it be loaded on the wagon, hauled to a depot, allowed to rest twelve hours or more, and then be reloaded again for delivery?

One more item of error in the delivery of milk is that of too many dealers with interlacing territory for delivery. One may see the wagons of half a dozen different dealers deliver milk in the same block.

Upon whom does all this delay and extra cost fall ultimately? It falls upon the helpless infants.

The trouble with the whole retail milk business is that it is gauged upon the culinary needs of milk and is not sufficiently considered from the standpoint of the babies' welfare.

INDORSED MILK REPORT

The American Public Health Association indorsed the report of the Milk Standard Commission of the New York Milk Committee. It had been rumored that there was to be opposition to the adoption of this report. The International Milk Dealers' Association sent a representative to the meeting and he traveled there in company with certain men known to be opposed to adoption of the report by the association.

When the report came up for consideration it was opposed by two speakers. One declared himself in favor of the principles of the report though he was not in favor of certain details. His objection was to the precedent established by the action.

For many years the laboratory section has been getting out standards. Being reports on laboratory methods by the laboratory section they had never gone into administrative methods. They had covered such standard methods as those for the analysis of water, air and milk. The public health officers' section had never reported any standard methods. In consequence the association had not gone on record in recent years as approving any administrative method.

The second speaker objected to allowing the sale of grade C milk. Grade C milk is milk for cooking purposes. It is allowed to contain one million bacteria before pasteurization. In cities where the milk is more than a day old before it is delivered a large percentage of the milk is grade C.

If this milk is not allowed on the market the supply will be far less than the demand and the price of milk will be doubled. The report allowed this milk to be used for certain purposes after being properly pasteurized.

These were the only two speakers against the report. The Association,

having listened to the objections, voted to approve the report. The American Veterinary Association had approved it the week before. It is very much to be hoped that the International Milk Dealers' Association will approve it when it meets in December.

After some years of talk the authorities adopted chemical standards for milk several years ago. At first the milk dealers opposed those standards because they did not know much about buttermilk percentage; they knew the farmer did not and, all in all, they did not see how they could conform. Now every up to date farmer has his hand Babcock and knows about the chemical standards. He has found that they are the very backbone of the business.

After many years of talk it is now proposed to establish sanitary standards. The way to measure the fat of milk was a chemical-mechanical test known as the Babcock. The way to judge of whether the milk is clean, fresh and cold is by the bacteriological test. The dealers are somewhat afraid of it as they were a generation ago of the fat test. In time it will be the salvation of the business. Standards should be expected to advance at least one step in a generation.

MILK STORE SCORE CARD

The Department of Agriculture does not think bulk milk should be sold. By bulk milk is meant milk that is shipped or hauled into town in cans and then, without being bottled, is loaded into wagons or kept in stores. When the customer buys a few cents' worth the dealer dips into the can with a ladle and fills a bottle brought by the customer. This latter part of the custom is responsible for the name, dipped milk, by which the commodity is known in some towns.

The Department of Agriculture has found that bulk milk means dead babies. Milk is too delicate. It will not keep when the dealer is constantly taking the lid off and dipping the ladle in. The milk, started bad, is made worse by the dirty bucket or bottle into which it is put and the warm room in which it is kept.

The agricultural department has watched thousands of babies indirectly for years and it knows. But the poor woman who has watched but one or two babies does not know and she has no way of finding out until it is too late.

Knowing that the selling of bulk milk in stores cannot be stopped at once the department has compiled a score card for use in such stores. It describes this card in Circular No. 217, Bureau of Animal Industry.

The dairy farm score card started with a score card devised by Health Commissioner Woodward of Washington. It has been perfected and pushed by the Department of Agriculture until it is in general use all over the country.

The milk store score card cannot be so effective but while a town is accumulating public sentiment against dipped milk its use will help to keep the death rate down.

On the score card 100 is perfect. If the utensils are steamed and thoroughly cleaned and kept so the fact counts 20. If the store is properly

equipped to clean and sterilize the utensils it counts 15—a total of 35 for utensils that are right. A good ice box counts 10; cleanliness of the ice box, 3; placed on ice as soon as received, 5; temperature of milk below 50°, 10; 51° to 55°, 8; 56° to 60°, 5; 61° to 65°, 2; a total of 28 for proper attention to cooling.

The remaining thirty-seven points are divided between items of lesser importance. Screening and freedom from flies gets a total of 9; so that the building, the attendant and a few miscellaneous items divide 28 between them.

In Boston 45 per cent of the dipped store milk contained over half a million bacteria. In St. Paul the average count of the dipped store milk was over 8,000,000 bacteria.

The Department of Agriculture thinks that where its score card is used the bacterial counts of dipped milk will decline.

HOW BAD MILK DOES HARM

How good milk does harm is another story. This one relates to bad milk. Unfortunately good and bad milk look much alike, smell much alike, taste much alike and act much alike on many of those who drink it but differently on others. Men differ greatly in their susceptibility to disease.

Nobody tries to judge of milk by its looks. When we come to the taste and odor the dealer habitually, and customers occasionally, make use of this method of judging.

Most of the milk odors and flavors are of stable origin—but the people have acquired a stable palate. When a pure milk (and therefore an odorless and almost tasteless milk) is introduced the public palate must be reëducated. The odor and flavor test is not much help in determining the wholesomeness of milk.

This is what is meant by varying susceptibility: If one hundred grown people were to drink a quantity of tuberculous milk, few of them would contract tuberculosis. If one hundred children were to drink from the same milk many of them would get abdominal tuberculosis. If the germ in the milk were that of scarlet fever or diphtheria, the difference between the sickness rates of grown people and the children would be greater still. When it comes to typhoid fever the shoe would be on the other foot. It is in the disease known as summer complaint that the greatest difference lies.

Every now and then we read of a picnic party being poisoned by ice cream. In such cases at least 80 per cent of the party is poisoned; few escape because of immunity.

The milk poison which harms babies is much more subtle. It misses all of the grown people and even many of the babies. If a mother concludes that because the milk has not made her baby sick it has not made other babies sick or that it may not make her baby sick next week or that it is good milk for all time she will be in error frequently. If she is to protect the health of her baby she must be constantly vigilant.

The most important quality to watch for is freshness. Where the cow is kept on the lot or the milk is bought from a neighbor little watching is

needed; but when the cows are in one state and the babies in another and all sorts of trains, wagons, and people in between, getting fresh milk is difficult.

In some towns all of the dealers and in Chicago some of the dealers stamp or write the day of the week on the cap of the milk bottle. I wonder if consumers always look for the date on the cap and I wonder how many refuse to take a bottle on Tuesday because it is stamped "Monday." Milk may be thoroughly wholesome on Monday and by Tuesday be bad enough to knock down one of every ten babies who drink it.

Taking it all in all the milk which does most harm is that which is not quite fresh enough to be good for all the babies who drink it and yet is too fresh to harm all—dangerous but not showing it.

CERTIFIED MILK

"Certified milk is the product of dairies operated in accordance with accepted rules and regulations formulated by authorized medical commissions to insure its purity and adaptability for infants and invalids."

This is the opening paragraph of the report on methods and standards for certified milk adopted by the American Association of Medical Milk Commissions and published as the June 14, 1912, report of the Public Health and Marine Hospital Service.

The steps to be taken by a community to get certified milk are as follows:

"Sanction for a commission with the right to use the word 'certified' is to be had from the above named association through its secretary, Dr. O. P. Geier of Cincinnati.

"The commission having been formed, it may receive applications from any who desire to enter into contract with them.

"The commission investigates the applicants and decides whether or not any or all of them are equipped to produce milk up to the certified standard. With those that pass they then enter into contract.

"The commission contracts to allow the milkmen contracting to use the label, 'Certified by ——— medical milk commission,' and to provide for such inspection as is provided for in the contract.

"The milkmen contracting agree to live up to the ninety-seven requirements of the contract and to pay the cost of the required inspection service.

"The ninety-seven provisions of the contract relate to the milk, the herd, the helpers, and stable and milkhouse hygiene. Some of them are:

"The milk must be fresh—less than thirty-six hours old.

"It must be cold—under 45 degrees.

"It must be clean.

"It must have a low bacterial count—less than 10,000.

"It must be produced from cows proven free from tuberculosis by the tuberculin test, and otherwise healthy as certified by a veterinarian.

"The cows must be properly housed in sanitary barns.

"The handling of the milk must be by clean, healthy men employing clean methods."

In order that these results may be accomplished there must be a corps of

bacteriologists, physicians, veterinarians and inspectors and these must make systematic inspections at short intervals.

The requirements of the contract are set forth in great detail.

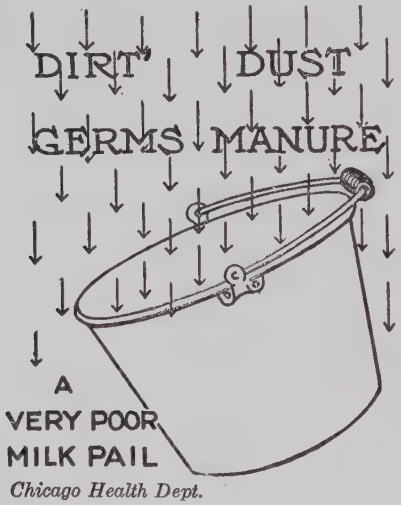
With this report as a manual a certifying commission will know just what to do. The purchaser of certified milk should read this document that he may know what he has a right to expect when he buys this milk at double the market price.

Milk made by men holding such a contract is entitled to the confidence of the community. Those who seek to cheat in the use of the term "certified milk" are not entitled to such confidence.

CLEAN MILK

"All is not gold that glitters." Not all white substances are clean. The cleanest appearing of all foods—virgin white milk—is the dirtiest of all foods. One can eat a good deal of dirt with safety if it has been cooked but raw dirt is dangerous. If one can eat a peck of dirt with safety it must be cooked dirt.

Dirt gets into milk from the milker's hands, from the cow's udder, from



Chicago Health Dept.

FIG. 188.

Chicago Health Dept.

FIG. 189.

the swish of the cow's tail, from the milk pails and milk cans, from the air of the stable and from any faulty handling after it leaves the farmer.

Simple procedures are all that are necessary to keep the dirt down to small proportions. They are clean hands, clean udder, and clean pails and cans.

Clean hands and clean udders require just a little time and some soap and water. Absolutely clean pails and cans require steam under pressure and this will not be available for the farmer unless he can persuade the factory to do it for him. If the factory will sterilize the cans the farmer need not expose them to the dust, air and sun as he must do now to keep them from stinking.

There is one other necessity that the farmer should meet and that is the use of the small mouthed milk pail.

A consumer who uses milk from a small dealer can form a fair idea of the cleanliness of milk production by looking for dirt in the milk at the bottom of the bottle. The consumer who buys milk from a large dealer cannot judge by this method because it is the custom among large dealers to filter the dirt out before bottling the milk.

Even a better method is to filter a pint of milk. Milk will filter slowly through ordinary filter paper particularly if it is well warmed. It will filter better through a pledget of absorbent cotton placed in a funnel. The dirt left behind will show up plainly on the paper or the cotton.

One of the most effective procedures used by the Chicago health department is the dirt test applied on the farms, at the factories, in the stores and in the streets.

The method is described in its annual report for 1911. It consists of a little filter in which the milk filters rapidly because it goes into a bottle from which some of the air has been exhausted.

Most of the visible dirt in milk is stable manure. However disgusting that may be the real harm is done by the growing bacteria washed from the stable manure.

The best test of dirt is the bacterial count. If fifteen drops contain less than 10,000 bacteria the milk is, and has always been, clean. If more than 10,000 and less than a few hundred thousand it is, and always has been, moderately clean. If in the millions it is, or has been, dirty.

A FLYLESS, ODORLESS DAIRY

For a number of years the big, husky boys at the Annapolis Naval Academy had a good deal of bowel trouble from time to time. Several epidemics of typhoid fever occurred. Paymaster Bryan investigated and came to the conclusion that milk was the cause. He made his recommendation on that basis. He was turned down. Even the medical staff would have none of it.

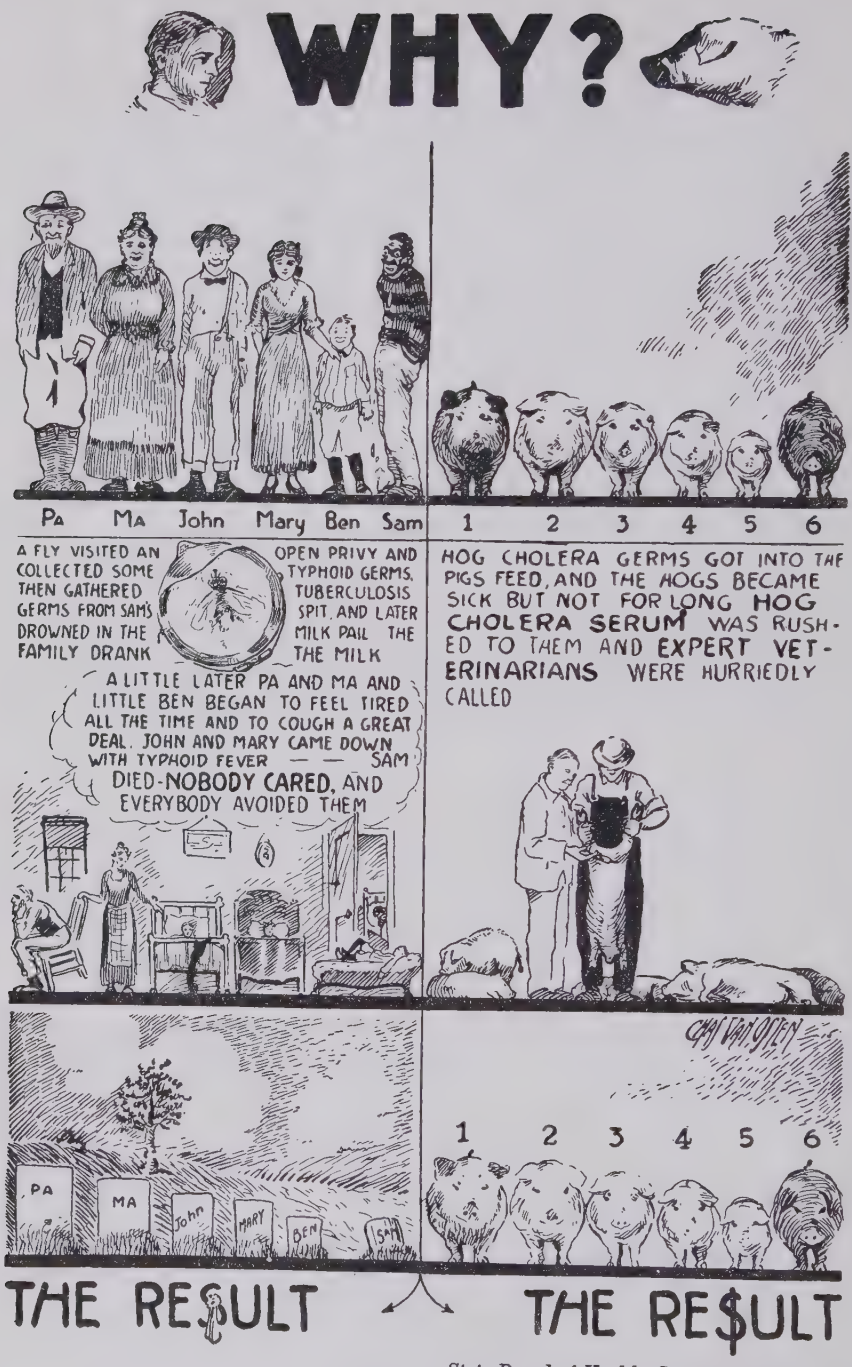
In 1910 a pretty fair epidemic of typhoid occurred. An investigation showed that there was a good deal to support the view of Paymaster Bryan.

The navy department put in its dairy, acting, however, with the advice of the dairy division of the Department of Agriculture. There has been no typhoid since.

What is remarkable is the drop in "excuses from duty" for minor intestinal disorders. For instance, the number of days lost for this cause was in April, 1911, 102; in April, 1912, 6; in April, 1913, 20.

In no month since the good milk was provided has the time lost from duty been more than one-fifth of what it was before and it is usually only one-tenth.

Mind you, these are not nursing babies. They are great, husky, resistant men. They each drink nearly a third of a gallon of milk a day. And you would drink milk, too, if you could get it as fresh, as safe and as good as they get it.


WHY?
Pa Ma John Mary Ben Sam
1 2 3 4 5 6
A FLY VISITED AN OPEN PRIVY AND COLLECTED SOME TYPHOID GERMS, THEN GATHERED TUBERCULOSIS GERMS FROM SAM'S SPIT, AND LATER DROWNED IN THE MILK PAIL THE FAMILY DRANK THE MILK
A LITTLE LATER PA AND MA AND LITTLE BEN BEGAN TO FEEL TIRED ALL THE TIME AND TO COUGH A GREAT DEAL. JOHN AND MARY CAME DOWN WITH TYPHOID FEVER — — SAM DIED-NOBODY CARED, AND EVERYBODY AVOIDED THEM
HOG CHOLERA GERMS GOT INTO THE PIGS FEED, AND THE HOGS BECAME SICK BUT NOT FOR LONG HOG CHOLERA SERUM WAS RUSHED TO THEM AND EXPERT VETERINARIANS WERE HURRIEDLY CALLED
PA
MA
John
MARY
BEN
SAM
1 2 3 4 5 6
THE RESULT
THE RESULT

State Board of Health, Jacksonville, Florida.

FIG. 190.

The site chosen for the dairy farm was about a quarter of a mile from the hospital. The hospital authorities objected. They said the odors and flies would disturb their patients. Paymaster Bryan and Chief Rawl said:

"We'll have no flies to disturb your patients but your flies may disturb our cows and infect our milk."

The dairy went in. There were no flies in the barns when we were there. They say they never have any.

They bought four dozen fly traps and put them around the barns, the lots and the pastures. Fly traps are easy to make and cheap to buy.

What perhaps does even better is that everything is extremely clean. There are no odors. No odors being in the air none get in the milk—which is also true of flies.

The cows are tuberculin tested; they are healthy. The milk is cooled to a little above freezing almost immediately upon milking and it is held at that temperature until it is ready for use. The barn is a long shed with a row of stalls down each side and a passage down the middle.

The ventilation and light are of the best. The drainage is so good that the yard does not get muddy. In consequence it is easy to keep the cows clean.

Things are so clean that there are no flies and, since this is true, the doors and windows may be thrown wide open. No screens are required. This means better air and fewer odors.

However, these are not the main points. The main points are that clean, fresh, cold, good milk reduces the sickness rate among grown people enough to pay for itself. When people can get high grade, clean milk they will drink a lot of it.

LA SALLE (ILL.) MILK

Dr. Greaves of La Salle, Illinois, set out to investigate the condition of milk in Illinois cities ranging from 6,000 to 15,000 inhabitants. He sent six questions to the proper officers. To this circular letter he received twenty-five replies. It is safe to say that the towns which did not reply all belong to the group of nothing-being-done.

In regard to the twenty-five from which replies were received there are milk ordinances in twelve but there are no efforts to enforce them. In four there were laboratory examinations for percentage of cream but in none was there an examination for dirt. In one there was a biennial visit from an inspector to the dairies. In the others there were no inspectors.

It is as a result of such conditions that the statistics show the infant mortality of towns of that size is as high as that of the large cities. In fact, the babies of the people of high intelligence are now much safer in the large cities than they are in the small.

The milk of the small place has the advantage of being close at hand. It is distributed while still fresh. On the other hand in and around the small place milk production is an on-the-side business, an extra-money, pin-money maker.

The highest grade city milkman, to whom the sale of milk is his one thought, will do his job so much better than the extra-money producer as to

much more than offset the disadvantage of distance. The highly intelligent parents use milk but only from the highest grade dealers and in consequence their children are safer than the babies of small cities.

However, it is easy for the people in smaller cities to have good milk if they will go after it. La Salle determined to have good milk. There is a level headed old time moneymaker, Matthiesen, who was willing to lend his brains as well as his money. Within two years La Salle was getting milk that ran below 10,000 bacteria—merely another way of saying the people were getting clean milk. Within two years they were subscribing to the following creed:

"1. That it was not necessary for milk to smell of the cow to be real milk.

"2. That milk which would never sour was preserved.

"3. That a certain percentage of the healthy looking cows was tubercular.

"4. That milk must be cooled immediately after milking and kept cooled.

"5. That milk could not be successfully delivered in open wagons in ordinary cans.

"6. That the good old family cow might be diseased, and if not milked under sanitary conditions the milk could be as infectious as any dealer's supply.

"7. That milk carried contagious diseases."

The school laboratories of any city of 5,000 are all that is needed to secure a clean milk for it. Let the milk brought to it be examined by the pupils for dirt and bacteria and publish the results in the local papers each week. The trick will be turned.

MILK OF RICHMOND, VA.

When at meetings of the Milk Standards Commission Dr. Levy had told of the excellent milk of Richmond, Virginia, the members of the commission had felt like asking the question asked about the hen: "Has she laid or lied?" So they voted to hold their 1913 meeting at Richmond to see for themselves what the answer was.

The milk of Richmond is produced in dairies licensed by the city health department. They are located about five to fifteen miles from the city hall, outside the city limits. The cows are milked about 5 A. M., and the milk reaches the retailers in town about 8 to 11 A. M.

The morning's milk is delivered before supper time. The evening milking is done about 2 P. M., *and the milk reaches the dealer about* 6 P. M. *The evening's milk is delivered in time for breakfast the next morning.*

The barns are not expensive as barns go in the Middle West. In fact, from that standpoint they are cheap. They are light and airy and clean. Most of them are of poured cement. All of them have cement floors and excreta troughs. They are all whitewashed and clean.

The cows were as clean as a dining-room table. The milk is cooled by spring and well water. The temperature of water in that vicinity is 60°. The milk heats up to 70° by the time the wagon gets to the bottling plant. By the time it is three hours old the milk has been chilled to 50° and bottled.

The bacterial counts are phenomenally low; more than half of them run below the standard for certified milk. A count in the millions is rare. In April the number of counts above 500,000 was but two.

Of course we expect the raw milk of a large city to run into the millions. There seems no way to avoid it. But the counts of Rochester, New York, a city not much larger and with a larger percentage of wagon-hauled milk, average much more than ten times as high.

There are but two cities in America as large as Chicago. Its largeness makes its milk problem different. There are many cities as large as Richmond. What Richmond has done Peoria, Lexington, Charleston and Pueblo ought to do easily.

The smaller cities have been content to do little because they have thought the dairy problem was a big city problem. In consequence the dairy division of the Department of Agriculture usually finds their dairies the worst of all.

They have usually done nothing because the way to do, as written about, is the way to do for the city of a million or more. If they followed the same plan it might not be the proper plan for them. The Richmond plan is one that fits their needs better.

The farms are scored on the government score card. They average more than 70 and some of them go as high as 90. When the government sent its inspectors through New England the scores averaged 43. When Mr. Whittaker would occasionally come through the Chicago district checking the local inspectors he rarely found a farm scoring over 5. Somehow we take it for granted that scores of 80 and 90 never can be attained by any except certified farms.

MILK AT SUMMER RESORTS

"The person who contracts typhoid fever as a consequence of drinking city water contaminated with city sewage has a moral, if not a legal, claim against the municipality for damages."

The above statement occupies the front page of *Public Health,* June, 1912, the bulletin of the Michigan Board of Health.

The Minnesota Supreme Court held Mankato, Minnesota, liable for the damage done to individuals by typhoid fever due to polluted city water. English decisions hold hotelkeepers responsible for damages to those of their guests who have contracted typhoid fever from milk.

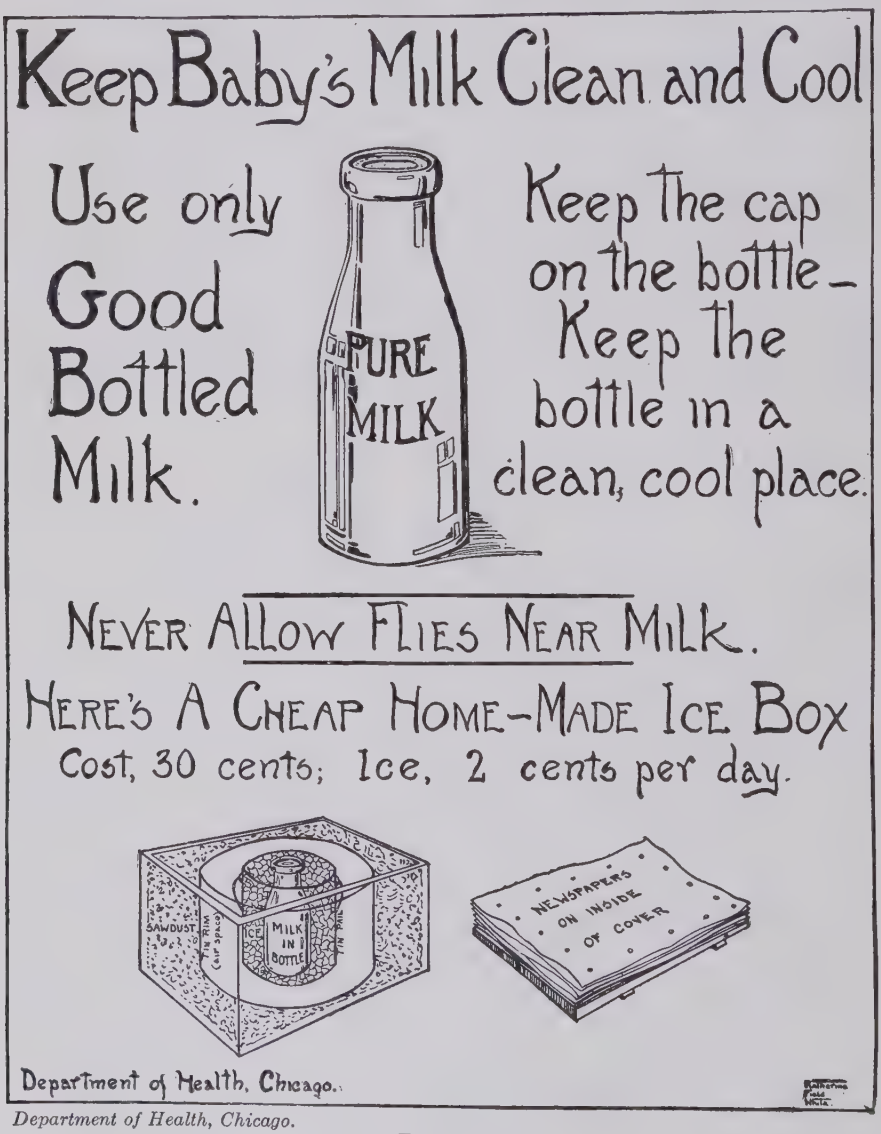
The resorter should be as careful to patronize a hotel with a good milk supply as he is to select one with a good water supply. The responsibility, legal and moral, for the safety of the milk supply is the same as that for the water.

It is easy for most resorts to have good milk. The cow and the consumer can get close together and that makes the milk problem simple. As a general proposition a resort community has no adequate municipal milk inspection; but there is no reason why the proprietor should not have his dairies scored on the government score card and the milk tested in his hotel for dirt, temperature and freshness. These are simple tests. He can put in a fairly satisfactory pasteurizer for the cost of a horse.

He can pasteurize his supply and be certain that he is not making his

patrons sick. He can see that his milk is dated. Having taken proper precautions he can advertise the fact. He can post his dairy scores, the results of dirt tests and other data. These things he can do easily. The trouble is little enough and he should do them. It should not be difficult at a summer resort to get clean milk with no dirt in the bottom of the bottle, cold milk less than 50° Fahrenheit, and fresh milk less than twenty-four hours from the cow.

Now comes the guest's duty. It is his duty to be discriminating, to refuse to patronize a place that does not have clean milk or does not give the facts as they are, and on the other hand, to patronize the proprietor who goes to some



Department of Health, Chicago.

FIG. 191.

trouble and expense to have things right and then tells the truth to his customers.

If the resorter cannot get good milk he will be moderately safe if he sticks to hot milk—hot milk in his coffee in place of cream, hot milk as a drink instead of cold. It may not suit his taste so well but if he be forced to stay in a dangerous place it will decrease his danger.

KEEPING MILK COLD

Cow's milk is not fit for baby food unless it has been cooled within thirty minutes of milking and maintained cold until it comes to the baby. Cheap coolers are now on the market. These are to be used by the farmers to chill the milk just as soon as the milking has been finished.

Unless the farmer uses ice he usually cannot reduce temperature in this way below 60°. Some farm wells and springs, however, run as low as 55°.

The milk should be delivered as soon as possible at some central point where a lower temperature is possible.

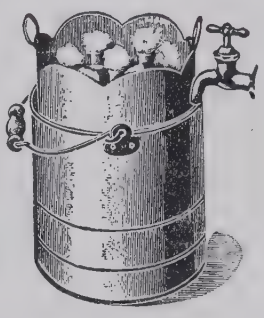


Fig. 192.—Arrangement of Apparatus for Rapidly Cooling Milk after Pasteurization or Sterilization (*Kilmer*).

At the different meetings of the Commission on Milk Standards Dr. Levy took the position that milk could be marketed in good shape without ice. He thought so because the farmers did not have ice in and around Richmond, Va., and the Richmond milk was low in bacteria. When the commission went to Richmond it learned the reason.

Fig. 193.—Pasteurization at Home.

The dairymen chill the milk on the farm with well water. They get it to about 60°. They deliver it twice a day (within four hours of milking) at the central plants where it is iced down to 50.

Richmond milk is about the best iced milk that we found anywhere although no icing is done on the farms. The double daily delivery of milk less than four hours old at the factory makes it possible for the Richmond dairyman to do without ice and still market good milk.

Where milk is shipped into town on cars the custom (where things are done right) is to ship in refrigerator milk cars. The railroads easily meet the requirement when they have to.

Milk in cans on wagons is kept cold by wrapping the cans with wet

cloths. When in bottles the boxes are packed with ice and wrapped with wet cloths.

To keep the milk cold from the time of delivery till getting-up time a covered bucket in which some water and a lump of ice is placed the night before suffices. After the milk is taken into the home it should be kept on ice in the ice box.

Rarely is the temperature of the ordinary domestic refrigerator cold enough to keep the baby's milk.

Bacteria multiply exceedingly rapidly in warm milk. The multiplication almost stops at 50°. It is extremely slow at 55°. It is slow enough at 60° to make it possible to keep milk for a day or more in good enough condition for a baby. At 65° within a few hours the changes are so great that it is too risky for baby.

WARM AND DIRTY MILK

Aside from lack of freshness milk may do harm because it has not been kept cold. If baby is to drink milk less than four hours old it does not matter much that it was not chilled as soon as it was milked. But when the cows are so far away that the milk is several days old when it comes to baby temperature does not matter.

Under such circumstances there is only one plan to follow—the farmer must chill the milk as soon as it is drawn. (The Omaha farmers have cheap, effective milk chillers.) He must keep it cool until he turns it over to the railroad; the railroad must keep it cool until it turns it over to the milkman; the dealer must keep it cool until he turns it over to the housewife and she must keep it cool until she gives it to the baby. Nowhere, at no stage must it go over 55°.

And the next point is that milk may do harm if it is dirty. If the housewife will always look at the bottom of the milk bottle she will protect herself against some, but not all, dirty milk. Many milkmen clarify their milk before they bottle it. Some farmers strain it as they milk it and others soon after. Clean cows, clean hands and clean pails standing at one end of the line and clean refrigerators, clean nursing bottles and clean nipples at the other end and everything in between clean is the ideal, though seldom attained. If the milking has not been as clean as it ought to have been straining is better than leaving the dirt in. If milking has been dirty and straining has not been done clarifying is better than doing nothing—but each is far from ideal.

Certainly, wherever there is visible dirt in a bottle of milk the milkman should be swatted and he in turn should swat the man who passed the dirt on to him.

There is a way by which the central office can tell whether the milk is or has been dirty or warm or old, or whether in it several of these bad qualities are combined. It is the bacterial count. Milk with a high bacterial count, with large numbers of germs, may do harm. Not all milk which has a high bacterial count will make the baby sick but such milk is that doubly dangerous borderline—good looking, bad acting milk, milk which tastes all right and which does not harm all the babies who take it. That it harms only 10 per

cent of the babies makes it worse for that partial safety throws mothers off their guard. The ninety should stand with the ten in efforts for protection.

THE GOVERNMENT'S POSITION ON MILK

Milk has a high bacterial count when it is dirty, or old, or warm. When it is clean there are few bacteria to multiply. When it is cold the bacteria multiply slowly. When it is young the bacteria have not had time to multiply.

To see that milk is cold inspectors are provided but as these inspectors cannot stand over every milk producer as the meat inspector stands on the killing floor the inspection service needs to be supplemented.

To see that milk is cold ordinances are passed and inspectors provided; but controlling the temperature by law has proved difficult.

To watch milk to prevent the sale of old milk has proved difficult. The method worked out to check the man in the field, to make certain that the milk sold is clean, cold and fresh is the bacterial count.

At this point comes the crucial test. Right here is to be fought out the battle for standards of wholesomeness in milk. Such standards have been indorsed not only by the national government but by the state and municipal governments—at least by a large number of them. They represent a crystallizing, a focusing of all the talk about clean milk.

These standards are being fought as were the fat standards ten to twenty years ago.

The Bureau of Chemistry of the Department of Agriculture has just issued a bulletin which sets forth:

"All statements that the Department of Agriculture has abandoned or will abandon the bacterial examination of milk shipped in interstate commerce as a means of determining its cleanliness and fitness for human consumption are without foundation. While the department has not fixed any specific bacterial count as a standard in the enforcement of the food and drugs act, it does use bacterial examinations in reaching its conclusions, and will continue to use these methods, irrespective of what action any association may take.

"The only change in the policy of the department has been to discontinue basing prosecution upon a bacterial examination of a single specimen. It now collects a number of samples at different times and examines them. If the bacterial examination shows the milk is not clean but is not a serious menace to health, and the bacterial deviation from clean milk is a small one, the department, through the bureau of animal industry, endeavors to teach better methods. If this fails, the department prosecutes the offender."

This statement of the position of the national government commends itself as being fair to consumer and producer.

ANOTHER MILK EPIDEMIC

In Wakefield, Massachusetts, in February a few years ago, a milker on a dairy infected about 200 people with streptococcus sore throat. The man was

taken sick with quinsy on February 3. His abscesses discharged within a few days and the man was able to go back to work by February 25. His wife also had a sore throat and cold in the head but she, too, was able to go back to bottling on February 25.

Cases of tonsillitis among consumers of milk from this dairy began to develop on the evening of February 26. The cases multiplied rapidly from that date to March 4. On March 3 the health authorities discovered the source of infection and took action.

The number of cases reported declined rapidly from the fourth to the seventh and after the latter date a few cases developed from contact with the existing cases. But it was evident that the source of the infection had been done away with. About two hundred cases of sore throat were brought to the attention of the health authorities in ten days.

The infected people were not very sick. They had sore throat, headache, suppurating ears, quinsy and enlarged neck glands. In some cases the neck glands remained swollen for several weeks.

The infection did not travel to the abdomen or elsewhere in the body. It remained localized in the head and neck.

This is noted because occasionally someone asks if milk-borne streptococcus infections are not always fatal. They are not.

The state laboratory found the infecting coccus to be a streptococcus. The field inspectors traced the infection back to one dairy and then to the one milker and his wife.

What was done? The milker and his wife were made to stop milking. The milk was pasteurized. As the dairyman had no facilities for pasteurizing it was necessary to carry on the process without apparatus.

The milk was placed in bottles. The bottles were set in a wooden vat which was filled with water to the top of the bottles but not over them. Then live steam was run into the vat until the temperature of the water reached 145°. It was held at that temperature for thirty minutes.

These two simple expedients stopped the epidemic within two days.

It never occurred to the milker that he and his quinsy could harm anybody. Yet he did more harm in three days than he will live long enough to offset.

The average milker knows about as much about the harm that he can do as did this man. It is just this fact which makes so many health officers believe that no raw milk should be sold. The law should require all milk to be pasteurized.

MILK SOLD IN SMALL CITIES

If you live in a city of 25,000 and want to know the condition of the milk that is being fed your babies read the report on the milk supplies of Urbana and Champaign (Ill.) made by Professor Barker of the University of Illinois.

The twin cities use 1,200 gallons of milk a day. Of this 115 gallons is brought in by interurban cars an average distance of twelve miles, and seventy-six gallons by steam roads an average distance of sixty miles. The

remaining 1,000 gallons is produced by small dairies located within ten miles of the university.

The milk is produced by twenty regular milk producers (possibly entitled to be called dairymen) and by twenty-five farmers who are intermittent and casual milk producers. Two dairies deliver 30 per cent of the supply and seven 70 per cent of it. The report does not say whether milk is delivered once or twice a day.

The price of bottled milk is ten cents a quart; of dipped milk, eight.

A few years ago Professor Rickards persuaded the councils of these cities to pass a good milk ordinance. No provision for enforcing the ordinance was made. No prosecutions have been made. The ordinances are dead letters. This everyone will recognize as about an average situation. And now for the interesting part of the report.

The university scored most of the dairies on the government score card. The average for twenty of the more permanent dairies was 25.5 out of a possible 100. Professor Parker says:

"This is believed fairly to represent the state of the average dairy farm in the vicinity. Under such conditions it is difficult to produce milk that is of uniform quality, or even milk that is tolerably clean."

Professor Whittaker, for many years of the Department of Agriculture, held that milk from dairies scoring 40 should not be a marketable commodity. It was either indecently dirty all the time or else at times was indecently dirty and dangerous; and there was no way of knowing which were the times of danger.

An average bacterial count of thirty-seven samples of milk from one dairy was 14,900; an average of seventeen samples from another was 453,000. The average counts of three dealers was over 100,000. Nineteen samples from one dealer averaged 664,000; twenty-one from another averaged 8,383,000; one sample contained 50,000,000, another 32,000,000, a third 27,000,000, a fourth 26,000,000.

The temperature of the milk ranged from 60° to 75°. The cows are not tuberculin tested. No effort is made to protect the milk from typhoid, tuberculosis, scarlet fever, diphtheria or septic sore throat bacteria.

The agricultural college of the university has some influence on the neighboring producer. Therefore, Mr. Reader, in a small city consider that the milk fed your children is, say, 10 to 20 per cent worse than that of Urbana and Champaign.

Milk that has been handled less than ten miles away and that is less than twelve hours old and yet has a bacterial count as high as this has been produced under conditions that are grossly wrong.

"PLAIN TALK TO CHICAGO MILK PRODUCERS"

This title we borrow from the *Orange Judd Farmer*. It heads one of the most sensible articles on the milk situation that has come to my notice recently. While it was written especially for the producers in the dairy district supplying Chicago, by leaving out names and incidents and using principles it applies to dairy districts everywhere.

The readers of the *Orange Judd Farmer* are farmers; therefore the article properly considers the question from the standpoint of the producer.

It begins with the agreement that tuberculosis is present in milk cows in increasing amounts; that human beings can be and are infected from drinking tuberculous milk. It says there are two ways of protecting the consumer. The best of these is pasteurization.

If pasteurization in operation could be made 100 per cent perfect and could be applied to all milk the tuberculosis-in-cows question would be exclusively a question of economics and the farmer the person most concerned.

The advice is given the farmers to exercise every bit of influence they can to obtain universal, closely controlled pasteurization. The nearer they can come to obtaining that result the more they will help to eliminate tuberculosis from their herds.

"Isn't this straight doctrine, milk producers?" the article says. "Get together on the pasteurization proposition and in so doing make the agitation on tuberculin testing unnecessary. Settle later the tuberculin test."

As to the second part of the above quoted advice they advise the farmer to get the best advice possible. "By sending speakers at $15 per speech who know nothing about the subject to talk about the unreliability of the tuberculin test, the producers are made ridiculous before the public," they say.

For some years the milk producers have been misled by those who have made money through misleading them. Is it not time now for them to break away from their exploiters and accept leadership from the editors of *Orange Judd Farmer, Hoard's Dairyman,* and other well informed papers and people?

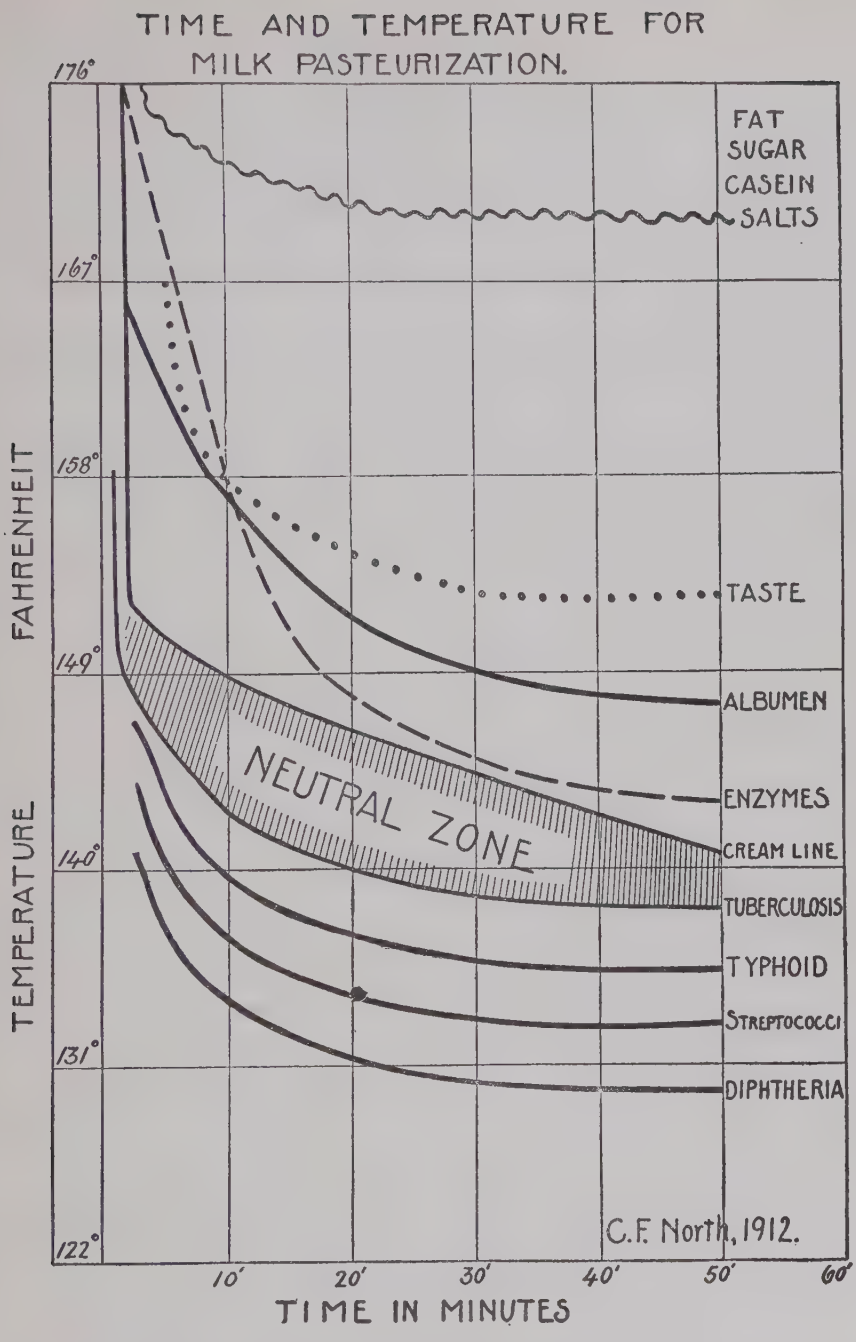
TREATING TAINTED MILK

August is the season for tainted milk. The pastures are dry and the cows nibble at weeds that they do not touch when the grass is good. In consequence the cows eat bitter weed, wild onion, and garlic, and about four hours later the odor and taste of the aromatic foods appear in the milk.

While there is no evidence that these flavors poison children they render the milk less palatable and sometimes they disturb digestion by disturbing appetite.

I know a physician who holds that the infant diarrheas of August result from certain weeds eaten by cows during that month of poor pasturage. His remedy for the baby illness problem of the great city is a requirement that all milk cows be stabled during the months when cows are apt to eat weeds. This, however, is speculation and the doctor alluded to does not claim to be able to prove his point.

The Department of Agriculture has been experimenting to find a way to remove the flavor from such tainted milk. The experts found that the following method worked satisfactorily: The milk is heated to 145° and while it is held at that temperature a current of air is passed through it. A ten minute treatment makes the milk fairly palatable; a thirty minute treatment removes all the flavor.



Public Health Service Report.

FIG. 194.—TIME AND TEMPERATURE AT WHICH SOME BACTERIA ARE KILLED AND AT WHICH THE COMPOSITION OF MILK IS CHANGED. Example: At temperature 140–149 for 20 minutes the bacteria of diphtheria, tuberculosis, typhoid fever and septic sore throat are killed; but neither the cream line, the enzymes, the albumen, the taste or the fats, sugar casein or salts is affected.

The apparatus devised by Ayres and Johnson consists of the following parts:

A tank (A) is surrounded by a water jacket. From the bottom of this tank a pipe leads to a tank (B) set on top of tank A. The milk is pumped through this pipe from A to B by a small pump. The tank B has a bottom perforated with holes one-thirty-second of an inch in diameter, placed at a distance of one-half an inch from one another. The milk flows in a fine spray through these holes into tank A. An air pipe leads into tank A, delivering air under pressure near the bottom of the tank. The air must be washed clean.

The milk is placed in tank A and by heating the water in the jacket the temperature is brought to 145°. If the milk is to be made into butter the temperature should be carried to 160°. The milk having been heated the pump is started and the steam travels from tank A through the pipe to tank B and then through the perforations back into A. Meanwhile the air is running into the milk in tank A at the rate of one-fifth of a cubic foot of air per gallon of milk per minute

The evaporation is 3 per cent—which can be made up with boiled water. The cream line suffers slightly.

The process continued for thirty minutes will result in a fairly satisfactory pasteurization.

ICE CREAM

The ice cream manufacturers are willing to spend money to prevent the government from having much to do with the control of their product. When Dr. Wiley set chemical standards they went to a great deal of trouble and expense to set the ruling aside. Now Dr. Alsberg is considering sanitary standards and the manufacturers are again active.

They object particularly to having bacterial standards incorporated as one of the requirements. When the question was before Dr. Alsberg they had a number of bacteriologists contend that bacterial standards as applied to ice cream were valueless. The investigations of these men have been made into a pamphlet which is circulated by the National Association of Ice Cream Manufacturers.

The following important statement was made by Professor Gordon:

"Given raw materials of low bacteria content, it can be said in absolute assurance that the ice cream manufacturers can produce with great ease ice cream of low bacteria count."

One of this group appeared before the recent meeting of the American Public Health Association, presented this report, and argued that ice cream should not be subjected to a bacterial standard. His argument was that, since ice cream commonly contained one to one hundred million bacteria, a variation of a few hundred thousand bacteria was of no great significance.

The discussion of the presentation for the ice cream men is worthy of consideration. The general consensus of opinion was that the variations noted were to be found and were unavoidable in the ice creams with bacterial counts running into the tens of millions but that they were not found in ice

cream with low bacterial counts; furthermore, that it is possible to market ice cream with very low counts.

Dr. Wiley said: "The experiments made by these gentlemen were not made on real ice cream, but on some other frozen products, unfit to be fed to hogs."

Dr. Freeman, secretary of the Virginia Board of Health, asserted that ice cream properly made from proper ingredients had a low bacterial count and that the reason these investigators had found such high bacterial counts was because they worked with ice cream made from ingredients that were unfit to eat.

Drs. Rogers, Kenyon, North and several other speakers said that ice cream could be made in such a way as to have a low bacterial count. It was a matter of starting with proper ingredients, freezing them while fresh and operating always in a sanitary fashion.

Many epidemics have been traced to ice cream as the source of infection. Improperly made ice cream has the highest bacterial count of any food substance. The Commission on Milk Standards is now at work on standards for ice cream. The national government is gathering information on which to make a ruling on ice cream.

Regulation of the manufacture of ice cream is certain to come. If the manufacturers are good business men they will help to bring it about.

What Constitutes Fresh Milk.—*Daily Reader writes: "In a recent article you said that milk that is not absolutely fresh is not wholesome. Do you mean that milk left from one day's supply to the next is not safe to use? Why is it that sour milk is supposed to be more wholesome and beneficial than fresh milk? Do you consider certified milk enough better to warrant the additional price? Do you think milk left standing in the glass bottle in which it is received, with the cap on it, fit to use in the raw state next day?"*

REPLY.—Milk properly kept—covered, cold and clean—is safe to use when left from one day's supply to the next. That is, it is safe for everybody except children under two years of age. Children under two should not use milk which has stood a day in the refrigerator. Occasionally, and for some people, properly soured milk is better than fresh milk but this is by no means an argument for old milk. If the certified milk is certified by a certifying body holding a permit to certify the certified milk for the baby is worth the difference in cost.

Flesh Made by Milk.—*P. S. C. writes: "1. Will milk, if taken daily, make flesh? If it will, how much ought to be taken, and how? 2. Is olive oil good for the system and does it make flesh? 3. Will either of these force pimples to appear?"*

REPLY.—1. Yes. Three pints a day in addition to plenty of other nutritious food. 2. Fairly good, but not especially so. 3. Yes—both.

Use of Milk Diet.—*W. B. F. writes: "Please tell me what benefits, if any, can be derived from an exclusive milk diet. How should it be carried out?"*

REPLY.—The milk cure is frequently recommended for Bright's disease, gout, neurasthenia, intestinal putrefaction and a few other diseases. The

treatment usually begins with four ounces of warm, skimmed milk every two hours; after a few days, six to eight ounces every four hours. Sometimes it is given flavored with weak tea, coffee or diluted with vichy. Constipation needs to be overcome. After four to six weeks other food is gradually added to the dietary.

One number of the Clean Milk Bulletin quotes an article from Nickel (Milch Zeitung, 1911, No. 39) in which it is stated that Pope Pius X partakes of boiled milk in the morning and during the forenoon and frequently has milk soups, milk dishes and milk puddings at his meals. He says the pope is half a vegetarian and from the beginning of his ecclesiastical life has used milk freely.

Effects of Milk Diet.—*Mrs. G. W. J. writes: "A diet of milk only for a period of four weeks is recommended in a health magazine as a cure for constipation and minor ills. It is stated that the arterial blood pressure will be permanently improved and organic functions restored. Will this increased pressure be beneficial or will it be accompanied by any danger?"*

Reply.—It will help your minor ills; may lower your pressure some; will probably help you in every way except that it will make your constipation worse.

Milk Disagrees with Her.—*E. B. W. writes: "I am fond of milk, but it gives me what old-fashioned people call a 'bilious attack,' violent headache and nausea. I have been intensely nervous all my life. I have always lived at high pressure, but have never indulged in liquor. I am a woman 49 years old. Why can I not drink milk? Lime water does no good. I've a fine digestion."*

Reply.—You have an idiosyncrasy against milk. Many people have it. Send to the Bureau of Animal Industry, Department of Agriculture, to get its bulletins on "Milk as a Food" and read about it.

Milk as Food.—*J. S. W. writes: "I read an article some time ago by some doctor, whose name I do not remember, stating that milk is not good for middle-aged persons. Kindly give me your opinion."*

Reply.—You misunderstood the statement. I imagine good, wholesome milk is good food for people of any and all ages. There are exceptions; but the rule holds.

Be Careful of Milk.—*A. K. K. writes: "We have a seven months baby whom we have been feeding with modified milk for the past three months. Our success is rather indifferent, for although the baby weighs seventeen pounds, he gets upset frequently. Do you think that the addition of oatmeal or barley water to the milk might help?"*

Reply.—Adding barley water will not help much. While you do not say how the milk is modified or what the trouble is my guess is that the baby has occasionally spells of diarrhea but that in the intervals the bowels are normal. If this is true it probably means that the milk is a little off at times.

Be certain that the modification is proper. Be certain that the milk is proper. See that it is properly pasteurized for at least six weeks yet.

Care of Milk.—*J. S. C. writes: "Some time ago you had an article on the care of milk and said it should not be kept in the bottles in*

which it is delivered. Please state what it should be kept in and any further details regarding care of milk, particularly in an ice box, where sanitary conditions and circulation are none too good."

REPLY.—You misunderstood me. Milk should be kept in the bottle until it is consumed. Especially is this necessary if the ice box is not sanitary.

Grape Fruit with Milk.—*B. W. wants to know if grape fruit eaten with milk is liable to make it curdle in the stomach.*

REPLY.—Milk should curdle in the stomach. Something is wrong if it does not. Grapefruit does not make milk indigestible.

Thermos-Kept Milk.—*R. W. writes: "I should like to know your opinion of the use of the thermos bottle for keeping warm during the night the baby's modified milk. The nurse prepares the warm milk about 8 o'clock and feeds the baby after midnight, sometimes not until 3 or 4 o'clock. The thermos seems a blessing for nurse or mother. But is it safe for the baby to keep the milk warm so long?"*

REPLY.—The habit of keeping food in vacuum bottles is growing. Some years ago some ladies appeared before the finance committee of the Chicago city council asking that an appropriation be made to furnish bottles to poor people.

The convenience is so great that such use should be encouraged if it is hygienically proper. It should be prohibited if it is doing harm.

It is not enough to say that babies six months to one year old should be fed but once during the night and that babies over one year old should not have any night feeding.

If parents are going to feed more frequently than this at night the information must be furnished them.

Dr. F. A. Tonney, director of the city laboratories, made bacteriologic examinations of milk held in thermos bottles with the following results:

If the milk as it is put into the bottle has a temperature of 115° or below the bacteria multiply very rapidly and in a few hours the milk is unfit for baby use. If the milk is put in at 140° or above the bacteria diminish until in a few hours the milk is sterile.

The conclusions are these:

1. Putting the baby's milk into a thermos bottle is never justified unless the temperature of the milk is first taken.
2. If the temperature of the milk is under 135° it will be unfit for use in a few hours.
3. If it is 135 to 140° it can be kept in a vacuum bottle with safety.

Is Centrifuged Milk Safe?—*W. J. C. writes: "Is the process of running milk through a centrifugal cream separator (and again mixing the milk and cream together) any benefit or improvement to the health conditions of it?*

"Does the centrifugal force remove the bacteria or microbes?"

REPLY.—No. The centrifuging is done to remove the cream. The milk and cream are then mixed in the proportions required by law.

The number of bacteria is higher in the cream than in any other part of the milk. That is to say that when the milk is centrifuged most of the bacteria stick in the cream part and few are thrown out.

It is the custom of men having centrifuges to filter the milk in addi-

tion. Filtering takes out the gross dirt and a fair part of the bacteria, though not all of them nor even most of them.

Proper pasteurizing kills 99 per cent. of the bacteria. As compared with the result filtering and centrifuging may be said to have no effect.

My advice to you is: patronize no dairyman who does not sell "tuberculin tested" or pasteurized milk.

How to Get Safe Milk.—*M. A. S. writes: "How is a person to know that milk is free from tubercle bacilli? I was brought up in the old-fashioned way, but what of the new way I am learning has certainly been a benefit to me and I will keep on. I have an idea how hard it is to convince others of this truth from my own experience."*

REPLY.—You are on the right track. Keep it up. The way to get milk free from tubercle bacilli is to patronize only responsible people who guarantee that their milk is from non-tuberculous cows or who guarantee their pasteurization; or else heat the milk before you use it.

Do Not Drink Raw Milk.—*Taylor writes: "I am living in the eastern part of North Carolina, where the weather is hot and malaria prevails abundantly. Am troubled every summer with dysentery. Please publish how that could be prevented?"*

REPLY.—If you are certain the condition is not pellagra but is dysentery proceed as follows:

From June to November each year drink no new milk. Heat every particle taken. Drink no raw water unless you are certain it is good. That about limits raw water to artesian water. Eat about half as much as in winter.

Questions on Milk Answered.—*C. C. J. writes: "I read an article in the Chicago 'Tribune' recently entitled 'Sterilized Milk Is Bad.' It gives the conclusions of a London chemist and other authorities and points out that sterilized milk is not only less nutritious than plain milk, but is actually dangerous. What is sterilized milk and what is pasteurized milk? Do these processes of preserving the milk injure or spoil it as a food? How does pasteurized milk compare with natural milk in nutritive properties?"*

REPLY.—I judge the article refers to milk that has been sterilized by boiling. Some authorities are of the opinion that boiled milk is less nutritious than unboiled milk. Others hold the contrary opinion. The opinion is rather general that boiled milk putrefies but does not sour. When milk is boiled most but not all of the bacteria are killed. Those which survive are the putrefiers. Some authorities hold the milk is dangerous on that account; others hold the contrary opinion. They say the milk becomes offensive and nobody will drink it. Pasteurized milk is milk that has been heated to somewhere between 140° and 170° Fahrenheit. This amount of heat kills the disease germs but does not kill the souring germs. Pasteurized milk sours but the process is delayed one to two days. The nutritive properties of pasteurized milk are the same as those of ordinary milk.

Good Milk Proposal.—*T. C. L. writes: "Since milk, next to water, is the chief necessity of life, why should it not be imperatively a city's business to supply it as well as to supply water? Could not Chicago have a belt of municipal milk laboratories surrounding the city, one laboratory to each railroad supplying a dairy region, to which milk could be brought by the*

quickest possible route? In such a laboratory the quality of the milk supplied by each farmer could be recorded, and the milk treated as the scientific staff of the laboratory should direct. The cans could be sterilized and sealed, and sent back to the farmer all ready for him to use. He should not waste time straining or separating the milk through imperfectly sterilized utensils, and he would be saved much time, and we should be saved having an easily contaminated food handled by a person not properly equipped for it. The morning milk could probably be delivered by late afternoon to specified areas and save night work for the milk wagon drivers. Downtown could be cared for by subways. Since all children, rich and poor, and all invalids, rich or poor, need the same grade of milk and need it badly, cannot public opinion be aroused to an activity that will eventuate in the city's supplying it as cheaply as possible and thus lessen the diseases and deaths that come from a lack of clean cheap milk and plenty of it? The many surveys of the milk supply of cities, as at present carried on, show that the present method is far from being an economical one."

REPLY.—The proposal, subject to some modification, is a good one. Portions of it are in use in different parts of the world. In time the general plan will be in universal use.

Milk Safety.—*N. S. writes: "Please advise as to what preventive measure should be taken by milk consumers of Chicago in the present prevalence of foot and mouth disease. How are we to know whether our supply is safe? What is to be done about butter, buttermilk, sour milk, and sweet and sour cream?"*

REPLY.—Use no milk that has not been pasteurized. This advice applies also to butter, buttermilk, sour milk, sweet and sour cream. Beyond this you need not go.

The best guarantee available is the reputation for integrity of the dealer who gives you the assurance that his product has been pasteurized.

Until the danger is past the people should be on the watch for sore mouth, especially in their children.

Certified Milk Safer.—*P. B. writes: "A friend has advised me to use certified milk for my baby. Will you please inform me the difference between this and the ordinary milk and if it is better for the baby? Also how to obtain it?"*

REPLY.—Certified milk contains 4 per cent fat. Certified milk is fresher and cooler, and has fewer bacteria. It is produced by healthy, tuberculin tested cows and the milkers themselves are subject to inspection. Carefully inspected certified milk is safer than market milk. It costs about twice as much as market milk.

The Chicago Medical Society (see telephone directory) will furnish you a list of certified milk producers.

Is Boiled Milk Nutritious?—*Mrs. A. T. Z. asks: "Is the nourishment impaired in any way by boiling milk? Is it harder to digest than raw or pasteurized milk? Does cottage or 'Dutch' cheese, made from raw milk clabber, contain wholesome nourishment? Is it easy or hard to digest? Should boiled milk or cottage cheese have a tendency to constipate?"*

REPLY.—Probably the majority of practicing physicians believe boiled milk is hardly less nutritious pint for pint than unboiled milk. The difference is slight. It is probably harder to digest than raw or pas-

teurized milk of the same grade. The bacterial products in raw milk are harder to digest than any changed albumins in boiled milk. The bacterial changes in raw milk decrease its nourishing power more than does the boiling of boiled milk; therefore boiled milk taken soon after being boiled is both more nutritious and more easily digested than raw milk as you get it under ordinary circumstances.

Cottage cheese is highly nutritious and when of good quality is thoroughly wholesome. It is easy to digest. All milk and cheese has a slight tendency to constipate. This is not through any definite action. The largest factor in ordinary cases of constipation is lack of bulk; and milk and cheese, especially after the water is absorbed, are concentrated foods; therefore constipation follows a milk and cheese diet unless some bulky food is added to it. In milk with a high bacterial count there are occasionally bacterial products that are laxative. These sometimes produce violent diarrheas and cholera infantum. In boiled milk there will be less of these products and therefore the use of boiled milk is more apt to be productive of constipation than the use of raw milk.

Refers to Boiled Milk.—*M. C. W. writes: "In a recent number of 'The Tribune,' an article appeared giving the views of an eminent scientist on the use of sterilized milk for children, pronouncing it an unfit article of food. I am sure many mothers would appreciate it if you would give your ideas on this subject. 1. Do the leading dairies use the sterilized milk? 2. How can one know whether the milk one is buying is sterilized or not?"*

Reply.—1. The milk referred to in the article is boiled milk. No dairies furnish boiled milk.

2. There is a test known as the Storch test. It will tell whether or not milk has been heated to 170 or over. It is not dependable when milk has been heated from 140 to 160. Any laboratory will make a Storch test.

Heating Water and Milk.—*J. A. M. writes: "Does not boiling the water precipitate nearly all mineral matter or the vital salts in the same and render them impossible of solution and assimilation afterwards? If so, does it not affect milk similarly?"*

Reply.—Boiling the water does not precipitate the mineral matter or the vital salts in the same. Mineral matter is more soluble in boiling water than it is in cold water. A kettle of water boiled until it is pretty well evaporated will precipitate its mineral matter because of the concentration from evaporation.

There are no vital salts in water.

Boiling milk does not precipitate its salts unless the boiling is kept up until most of the milk is evaporated. Mineral matter thrown out of solution through concentration will go back into solution when enough water is added so that concentration no longer exists.

Vary Warm and Cold Milk.—*N. E. F. writes: "I am drinking three quarts of milk each day in an effort to gain in weight. Would you advise it taken warm or cold, and do you think three quarts is enough to get results? In addition to the milk I have my breakfast and dinner at night with the family. I am perfectly well in every way, but need a few more pounds. I am also taking a physical course."*

REPLY.—It does not matter whether you take the milk warm or cold. Vary it that you may not grow tired of it.

If three quarts of milk in addition to your regular diet does not fatten you you cannot get fat. Some people cannot. I would not advise you to continue using so large a quantity for many months. It strains your eliminating organs a great deal.

Are you certain that you do not worry? Peace of mind and regular habits are nearly as effective as milk.

Condensed Milk Safe.—*J. P. writes: "Is this so-called evaporated or condensed milk as good as fresh milk, or is it injurious to the health? In several instances, when using evaporated milk, I have found in the bottom of the can tiny bits of lime or some other substance. On account of fresh milk being so poor in the winter we have decided to use evaporated milk, but have been told that it is not well to use it continuously."*

REPLY.—If it is to be used by grown people, condensed milk is just as wholesome as fresh milk. It is somewhat safer. It is a better summer food than a winter food since it is somewhat low in fats. It is better to give babies fresh milk. This is especially true in winter. If in summer, say for three months, the choice lay between a dirty whole milk and a condensed or evaporated milk the decision would be in favor of the latter. If the whole milk is clean it would be in favor of the former.

Try Cheese and Milk.—*R. A. writes: "Every summer at the beginning of the hot weather I have something like summer complaint. The doctors have called it colitis. The first attack generally starts with dysentery and much pain. I am troubled all summer and I generally can control it by taking a strong astringent. I took an astringent all last summer and, unless I do this, I become terribly run down and nervous. Can you tell me any diet that would help me get through the hot weather without the usual attack? I am now 38 years old and don't believe the attacks are quite so severe as when I was younger. I fatten up every winter and eat anything in reason."*

REPLY.—Write to the Department of Agriculture at Washington for its bulletins on cheese and milk as foods. Try living on cheeses, boiled milk and bread.

Ice Cream Poisoning.—*F. C. writes: "On Sunday last a man, his wife, and two children were all taken sick with the following symptoms: Fever, vomiting, and a severe diarrhea. All had chills, and the temperature ranged around 102 to 103 degrees. All had eaten ice cream the evening before. Was this ptomain poisoning, or was it from the cream, freezer, or from the vanilla flavoring? Two of the neighbors ate of this cream and were attacked in the same manner. All recovered."*

REPLY.—They certainly had some form of food poisoning. The evidence you present points clearly to ice cream poisoning. The poison in that case was tyrotoxicon. It is the custom to age milk before freezing it into cream. Sometimes the aging is overdone.

Pasteurized Milk.—*B. F. W., Jr., writes: "You say 'always and ever drink no raw milk.' Do you mean that pasteurized milk should be heated or boiled to insure safety?"*

REPLY.—Pasteurized milk is not classed as raw milk. Unless you are certain the pasteurization is properly done you had better heat the milk at home during June, July, August and September.

Pasteurization Enough.—*J. S. writes: "I saw a statement in a newspaper recently in which the claim was made by some physician that pasteurization of milk was not sufficient protection against foot and mouth disease. This doctor claimed that all milk should be boiled in order to insure protection."*

REPLY.—Pasteurization is enough. Boiling is recommended by European physicians where the milk is from cows having the disease or suspected of having it. In this country such cows are killed.

Pasteurized Milk Constipating.—*E. G. S. writes: "Will pasteurized milk, used as a drink, cause constipation?"*

REPLY.—Yes, it will contribute somewhat. Milk is indirectly constipating; that is, it is not bulky enough to be an ideal food. Pasteurized milk is somewhat worse in this particular than raw milk because the germs in raw milk may be slightly laxative at times and may cause diarrhea. Continue using boiled milk to be safe against tuberculosis and typhoid. Eat vegetables, fruit and bran enough to cure constipation.

Pasteurize the Milk.—*C. E. writes: "In a country town where there is no such thing as certified milk or inspection of dairies, how can we protect our children from tuberculous milk?"*

REPLY.—Keep a tuberculin tested cow, for one thing. Pasteurize the milk, for another. The Illinois Food Commission distributes a circular on home pasteurization of milk.

Sour Milk.—*H. A. T. writes: "Professor Metchnikoff suggests the drinking of sour milk, on account of the lactic acid it contains, as a cure for colon infection. If the use of enemas and cathartics has ceased to destroy the colon bacillus what is your opinion regarding use of sour milk? Would there be any harmful results besides the good it might do? How much should be taken during one day?"*

REPLY.—The souring germs in sour milk are not very strong. It will help some. Eat as much as you like.

Sweet Milk and Buttermilk.—*H. N. W. writes: "Will you please tell your readers what you think of thick milk, clabbered milk, and buttermilk as regular articles of diet? Will you tell us what you know about their nutritive value?"*

REPLY.—When buttermilk retails at 4 cents a quart and sweet milk at 8 cents $1.00 buys 1.8 times as much protein in buttermilk as in sweet milk and $1.00 buys the same amount of heat and energy in buttermilk as it does in sweet milk. Buttermilk is, generally speaking, more easily digested than sweet milk. Therefore, buttermilk is somewhat of a bargain in winter and much of a bargain in summer.

Clabber and sour milk have all of the nutrition of sweet milk. When the human stomach starts digesting milk the first step is to sour and "clabber" it.

It is generally held that good soured and "clabbered" milk is not only nutritious but easily digested.

Buttermilk Safer.—*L. C. W. writes: "Will you kindly inform me whether buttermilk, as ordinarily sold in Chicago, is as apt to contain typhoid germs as regular milk? What is the relative nutritive value of milk as compared with buttermilk?"*

Reply.—Buttermilk as sold in Chicago is somewhat safer as regards typhoid fever than is sweet milk. Typhoid bacteria in milk tend to die out, especially in the acid of buttermilk. A large part of the buttermilk sold in Chicago has been pasteurized preliminary to churning. However, we will make a mistake if we are careless about buttermilk. There is the same necessity for getting it from clean and careful people as there is with sweet milk.

The nutritive value of milk as compared with buttermilk is about as 20 to 18—that is to say, you get about as many energy units out of a pint and a quarter of buttermilk as you would out of one pint of sweet milk. The difference between the two is largely in heat making qualities. The fat of milk goes in the main to the making of heat.

The albumins of buttermilk, however, are somewhat more easily digested and absorbed unit for unit than those of sweet milk. I mention these things in order to make it clear that a measure of calories is not the only thing to be taken into consideration in the selection of foods.

Buttermilk.—*F. A. H. writes: "1. Is not buttermilk wholesome to drink when it is sour? 2. I am fond of thick or loppered milk and have supposed it was healthful, although sour. Do you consider it so? 3. Why do we guard against sour milk for babies and others if the loppered milk is healthful?"*

Reply.—1. Yes.

2. Yes.

3. Clabbered milk is wholesome for grown people, but not for babies.

Buttermilk as Beverage.—*Mrs. A. L. S. writes: "For how long a period will buttermilk remain in condition for drinking purposes, supposing of course it is kept in a chilled atmosphere?"*

Reply.—Under the proper conditions buttermilk will remain in a condition for drinking purposes about twenty-four hours longer than sweet milk.

Kind of Buttermilk.—*Constant Reader writes: "What kind of buttermilk is the most effective, artificially soured milk or the regular buttermilk?"*

Reply.—If you can get freshly churned buttermilk made from milk known to be right it is the kind to use. If this cannot be had get the artificially soured milk made from pasteurized milk. If your dealer does not handle this kind of buttermilk patronize one who does. Do not buy buttermilk churned in a store in the city unless you know they churn good milk. Some churn bargain milk bought here and there—milk that dealers have had left over. Buttermilk from whole milk is not as wholesome as buttermilk from soured skim milk or buttermilk left after butter-making. One of the advantages of good buttermilk is that it is low in fat or grease.

Gives Buttermilk Formula.—*G. M. S. writes: "Will you please give me a formula for the proper preparation of soured milk, to be used for the prevention of intestinal putrefaction?"*

REPLY.—The method of making culture milk is as follows:

Take one quart of skimmed milk without preservatives. Heat it until it begins to simmer, put bottle in cold water, add one-sixth quart hot water. When the temperature of the mixture is about milkwarm, add one lactone of culture tablet, cover it up and let it ferment at room temperature for thirty-six hours, then keep cold until it is used up. Shake before using it. If you wish to make a buttermilk out of the home milk instead of the skimmed, use one-third quart of hot water instead of one-sixth. Note that skim milk and not buttermilk is used.

Culture Buttermilk Better.—*Daily Reader writes: "1. Is the natural buttermilk from the churn any more wholesome than the artificial or culture buttermilk? 2. Which would have the better effect against intestinal putrefaction? 3. Would impure or carelessly handled milk lose its unhealthy quality when turned into buttermilk? 4. Are dairies under any compulsion to label buttermilk according to whether it is churned or artificial milk? I know of only one large dairy selling buttermilk that is labeled 'culture,' but most people seem to think that we do not get any natural buttermilk from any of the dairies."*

REPLY.—1. No. Some people prefer the taste of old-fashioned churn buttermilk. From the standpoint of wholesomeness the culture product has the better of it.

2. Probably the culture kind. In the one the acid producers are hit and miss. In the other the added acid producers are more uniform.

3. No.

4. No.

Value of Buttermilk.—*F. L. F. writes: "Please inform me why buttermilk is healthy and in what way it is conducive to put one in good condition?"*

REPLY.—Buttermilk contains less fat than sweet milk. For this reason it is the better summer drink. The casein in buttermilk is chemically and physically in better condition for digestion by grown people at least than is that in sweet milk. The idea that the lactic acid bacilli of commercial buttermilk are conducive to health of themselves is not correct.

When Buttermilk Disagrees.—*M. W. D. A. asks: "Is buttermilk harmful to me, subject to acid conditions? Have fancied when I drank it that sensations were unpleasant in digestive tract and that indirectly the nervous system was affected."*

REPLY.—There are many people who are not pleasantly affected by buttermilk. You may be one of those. If it does not agree with you by all means discontinue it.

CHAPTER XXX

Lymphatic Glands

About every so often when reading the morning paper your attention is claimed by an account of where, and how seriously, a herd of cattle is afflicted with lumpy jaw (actinomycosis). Sometimes this disease attacks the lymphatic glands in and about the region of the neck and jaw. It may attack the lymphatic glands in other regions of the body. Usually, however, it attacks the bony structures of the jaw.

Lumpy jaw is caused by a specific, vegetable parasite. These parasites are unusually large. For this reason it is difficult for them to trail along the lymphatic system. Hence, the gateway through which they enter the system is perhaps through cavities in the teeth.

Lumpy jaw as a disease is not confined to cattle. It attacks man as well. It may attack any organ or structure in the human body. Osler refers to the fact that Dr. Hektoen makes the statement in an unpublished paper that this disease attacks the myocardium even more frequently than syphilis.

If you chance to visit the Stockyards be sure to observe the method of handling hogs in the various steps of slaughtering. You will notice that after the hog is slaughtered it is placed in a guideway for transportation to its final destination in the preparation for ultimate consumption.

Stationed along this guideway at points some distance apart are two men. These are inspectors. They are experts. They are supposed to be, and, in fact, are, able to detect disease by examining the kernels (lymphatic glands) in and about the neck and jaw of the carcass.

The first inspector thrusts his hand into the gap in the flesh about the neck, made for the purpose of affording free bleeding, to examine the glands in and about the neck. On account of his acuteness of touch and wide experience he is able to tell quite accurately and quickly if the glands are diseased. If they are, he places his sign somewhere about the carcass (ears perhaps), so that its final disposition may be in accordance with the rules and provisions of constituted authority. If they do not indicate disease he signifies that it has passed inspection by not marking it at all.

The second inspector makes his examination after the animal has been drawn. Like the first inspector, he places his approval as to whether it is or is not of a certain grade by some predetermined mark for identification. By this means much of the unfit meat and by-products are identified and prevented from being worked in with the final food products for general consumption.

As a matter of historical information, it will be interesting to know that the first facts concerning the lymphatic glands and lymphatic system were the results of some observations made by a number of eminent scientists upon

living animals. Although the lymphatic glands and lymphatic system were known to Hippocrates their true significance and functions were not understood until within comparatively recent years.

In the early part of the sixteenth century Asellius noticed the behavior of the lacteals in the living dog. This skilled anatomist saw that the lacteals, when cut, exuded a whitish liquid. This led him to conclude that he had discovered a new kind of vessel.

A series of experiments and observations made by him established beyond question that there existed a relation between the presence of a white liquid (lymph) in the lacteals and the products of digestion.

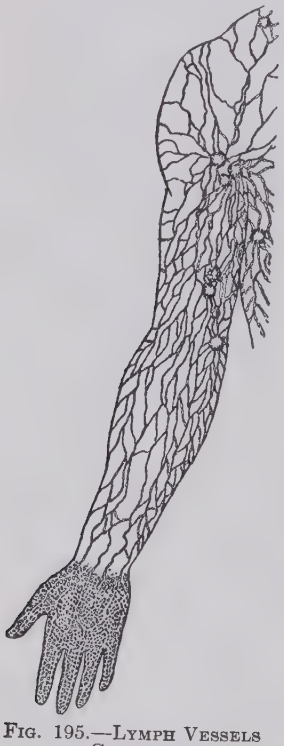


FIG. 195.—LYMPH VESSELS AND GLANDS OF ARM AND HAND.

While it is rather unfortunate, especially for him, that he failed to comprehend the true significance of this phenomenon, his discoveries served as a stimulus to those who followed in their efforts to determine the part played by these organs in the general metabolic processes.

About the middle of the sixteenth century the general functions, origin, distribution, and structure of the lymphatic glands and the lymphatic system, as we understand them today, were discovered, and worked out more in detail by Pecquet of France, Bartholin of Denmark, Jolive of England, and Rudbeck of Sweden.

A few years later another set of scientists began the refinement of the work already done. About this time the work which was done was preserved in books and in the form of charts.

These documents, even at the present time, are considered authoritative. Among these workers might be mentioned Hunter, Hewson, Cruickshank, and Mascagni.

A still more delicate refinement of the lymphatic system and its functions as we know them today was worked out and handed down to us by Sappey, a noted French scientist.

It is hardly saying too much, I believe, to say that in the discovery of the lymphatic system Sappey, Starling, and the other scientists and investigators who labored in this field of useful endeavor did as much, or even more, when they discovered the lymphatic system and its function for the science of medicine and surgery than Harvey did when he discovered the circulation of the blood.

In discussing the diseased conditions of the lymphatics, Osler has the following to say:

"The great majority of the diseased conditions of the lymphatic glands are secondary in nature, and are the direct result of the part played by the lymphoid structures in the protection of the body. In the exercise of their function as filters of the lymph stream, whereby they remove from the latter both the bland and the harmful substances gaining entrance into the

lymphatic vessels, their own integrity is often sacrificed to the welfare of the organism as a whole.

"Into the lymph stream of any region of the body a great variety of formed elements may pass, such as dust, carbon, bacteria, disintegrating red and white blood cells, blood pigment, dead tissue cells, inflammatory exudates, tumor cells, toxic substances, etc. Usually the regional lymph nodes filter out such foreign substances, and retain them either permanently or temporarily, in some cases rendering them harmless or destroying them, while in other cases the injurious agent is able to cause degeneration or necrosis and inflammation within the lymphoid tissue itself.

"In this conflict, particularly when pathogenic bacteria are concerned, the lymphatic glands may suffer severe inflammatory processes, even to the extent of total destruction by suppuration; but in the great majority of cases the infective agent is disposed of by the gland after a more or less marked local inflammatory reaction. . . .

"Since the involvement of the regional lymph glands is usually secondary to some primary infection within the region tributary to them, we find, for example, involvement of the axillary and cubital glands in the case of infection of the hand, arm, of mammary gland; involvement of the cervical glands in infections of the mouth cavity and pharynx, of the bronchial glands in pulmonary infections, of the mesenteric glands in intestinal diseases, of the inguinal glands in infections of the external genitals and lower extremities, etc.

"Such an involvement of the regional lymph glands occurs also in chronic inflammations of the corresponding regions, and in the case of malignant tumors occurring therein, particularly carcinoma."

Some years ago a baby show was held in Chicago. The babies were all registered. As a precaution, the officers conducting the show provided for the physical examination of all of the babies entering the contest.

Stationed at the entrance of the hall where the show was held were a number of physicians, whose duty it was to examine the lymphatic glands in and about the neck and jaw of each baby as it entered the hall, to see if they were diseased.

If they showed evidence of disease the baby was excluded from entering the contest. If they did not the child of course was permitted to enter. By this means the health of the entire body of children was greatly safeguarded.

Diphtheria, scarlet fever, measles, mumps, and the like usually cause enlargement of the kernels (lymphatic glands) in and about the neck and jaw. Even a bad sore throat, particularly when the tonsils are involved, may, and often does, cause enlargement of the glands at the angle of the jaw, and where the inflammatory process extends to and involves the ear, those just back of the ear within the region of the mastoids.

Occasionally the glands under the tongue just back of the chin become enlarged. This is usually the result of an infection that has got in through the cavities in the teeth.

Enlargement of the glands under the arm is usually caused by some disease of the mammary gland. Because of the nearness of these glands to the primary seat of infection they are exposed to a concentrated form of toxin.

The inflammatory processes resulting from this form of infection is sometimes so severe that the glands become large and soft, and then suppurate.

A general inflammation of the lymphatic glands may occur in any one of the several infectious diseases. It may occur in either the adult or the child—usually the latter.

The most common form of this inflammatory process is that which results from so-called scrofulous conditions and tubercular infection. These conditions are ofttimes neglected and terminate in suppuration.

A similar chronic suppurative condition of the glands is not infrequently found in children who have rickets. Where these and similar conditions of the glands are recognized early enough by proper treatment resolution may be established without a dissolution in the continuity of the tissues which results in the formation of so many unsightly scars.

The lymphatic glands are globular, ovoid bodies, made up of a fibrous framework, lymph sinus and lymph follicles. They are widely distributed throughout the body. They follow all of the blood vessels to their remotest ramifications, in many cases being even more remote than the blood vessels. It is through these canals that the lymph must percolate in its course to join the blood vessels.

The lymphatic glands enter into the formation of the lymphatic system. Other organs of the lymphatic system are minute and larger spaces of definitely walled capillaries and vessels containing lymphatic glands. It is through these canals that the lymph must percolate to join the venous system.

The lymphatic glands probably stand at the gateway of all lines of disease invasion. Up to the present time disease of the lymphatic glands have not received as much consideration as they possibly deserve.

When anything interferes with the normal flow of lymph the lymph glands and vessels soon become distended. Since their walls are of low resistance their fluid is easily forced into surrounding tissues.

If the obstruction continues the tendency to set up various diseases greatly increases. While many of these diseases are only secondary in nature they should more often be considered of primary importance, as by so doing the more serious sequelae of many infectious diseases can be prevented or at least greatly mitigated.

A tolerably correct pictorial idea of the relation of the lymph to the tissues of the body can be formed by considering the tissues as made up of the structure of a sponge, and the sponge as having been suddenly immersed in water and then withdrawn. In other words:

"All the cellular elements of the tissues are to be considered as bathed in a sea of lymph."

Since this is true, it can be readily understood that a thorough knowledge of how disease attacks the lymphatic system becomes of highest importance.

HODGKIN'S DISEASE

A London brewer dying in 1724 without issue left his property as an endowment to found a hospital bearing his name, Guy. One hundred years ago a physician at that hospital described a disease observed in the ward. The physician was Hodgkin, and the disease took his name.

In Hodgkin's disease the lymph glands swell. These small hard nodules under the skin, in the neck, under the arm, in the groin, and in the internal organs make one think of infection. Such enlargements, as we ordinarily see them, are due to infection, and, in many instances, the ordinary man knows just when the infection entered and what was the nature of it.

Hodgkin's disease has all the earmarks of a mild, slow, relentless infection—one that never kills tissue and causes abscesses but one that weakens the person little by little and causes death in a few years. But no laboratory examination of Hodgkin's showed the infection, and so nearly a hundred years went by. However, the money of the London brewer and the brain of Hodgkin, the hospital physician, had laid the foundation.

Recently Bunting, at the University of Wisconsin, announced that he had found the cause of Hodgkin's. When these glands begin to grow the customary thing to do is to run to a surgeon to have them cut out. But cutting them out does no good. New ones grow back almost at once.

Many people with Hodgkin's go to Rochester, Minnesota, to the Mayos. Bunting asked them for some material and they removed a few glands from a patient and sent them to him. Bunting found a bacillus, grew it, and, injecting it into monkeys, produced a disease with the symptoms of Hodgkin's.

Then Billings took some glands, grew the bacillus described by Bunting (and perhaps also described by Frankel) and made from them a vaccine. This vaccine he gave to a dozen patients. The dose ranged from 5,000,000 to 100,000,000 bacteria. The injections are given hypodermically once every five to seven days. Following the second or third injection there is a high fever lasting a few hours. Some of the patients are apparently well now.

Neither Bunting nor Billings makes any positive statements yet. They do not say they have found the cause or the cure of Hodgkin's. They tell what they saw and what they thought of what they saw and they ask others to check what they did and then tell how it impresses them.

It seems fairly certain that the vaccine will not be of service in late cases of Hodgkin's—that is, for people too weak to stand a day of high fever; that it will not be of service where the glands in the chest are large enough to be shutting off the wind or interfering with the heart. Other cases of Hodgkin's are proper for trial. Physicians who want to use it can secure it, I am sure, through their druggists.

Let us hope that the problem of Hodgkin's has been solved. If so, the next step will be to work out a cure for its kinsman, leukemia.

Leukemia and Hodgkin's.—There are a few diseases which are characterized by enlargement of lymph glands but in which, if germs be present, their presence has not been proved. The most important of these is leukemia.

The white blood corpuscles are highly serviceable. They are the fighting forces of the body. They are powerful in repelling any invading enemy.

Unlike the red blood cells, they can do their work wherever the work is to be done, either within or without the blood vessels.

They are constantly going through the walls of the blood vessels and over to some nook where there is a job to be done and then back through the vessel wall into the blood stream.

They are so efficient that not many of them are needed. The red blood cells are six hundred times as numerous.

In leukemia the number of white cells is increased. Instead of a count of 8,000 there may be a count of 400,000 in each cubic millimeter, merely meaning that they are fifty times as plentiful as normal. In pneumonia, in blood poisoning, and in a few other diseases, the leukocytes are increased three or four fold because their work is increased three or four fold. In leukemia they are increased fifty fold and if their work is increased nobody has ever been able to prove it.

Leukemia in older people is characterized by an enormous enlargement of the spleen without much enlargement of the lymph glands. Leukemia in younger people is characterized by enlargement of the lymph glands without much enlargement of the spleen. There are other cases in between.

If the lymph glands enlarge and no local reason can be found the blood should be examined to decide whether leukemia is present.

Protect Lymph Glands.—When a lump can be felt the person most interested is liable to become greatly alarmed. Sometimes this alarm is justified and sometimes it is not. It all depends on what caused the lymph gland to swell for the lymph gland in swelling was merely doing its duty.

If fear stimulates one to find out what lies back of the swelling and to try to remedy it, it does good. If it is carried beyond that point, of course it does harm.

The sane course to follow when one discovers an enlarged gland is to find where the absorption is taking place (if possible), what is being absorbed, and then to devise a method of preventing the absorption.

Lymph flow is not as uniformly in one direction as is blood flow. The arrangement is comparable to the stream arrangement at the mouth of the Mississippi river where the water, though usually flowing down one channel, is rather easily diverted to another.

Nevertheless, the lymph flow is regularly enough in one direction so that, given an enlarged lymph gland, we can guess pretty well where the absorption got in. For instance, enlarged glands in the neck well to one side directly below the ears mean absorption from the throat.

As nearly all of the infections of the throat get in through the tonsils, the wise procedure, when the neck glands enlarge, is to examine and re-examine the tonsils. If kernels come under the arm the wise procedure is to go over the arms and fingers minutely for the focus of infection.

The old plan of treating enlarged lymph glands was to paint them with iodin or to poultice them, and finally to lance them—as though the real seat of the trouble were in the gland. It may be necessary to lance kernels. If they are full of pus it is the proper policy.

It may be necessary to remove them radically by operation. If they are damaged beyond service and beyond repair, it is proper to remove them. But no kernel that is not damaged beyond repair should be removed. It is

better by far that it should be there filtering out poison, even though swollen and hurting, than that the poison should reach the blood.

What should we say about the person who allows absorption to proceed uncared for until his faithful servant, the lymph gland, breaks down and must be removed?

What can he do? That depends upon the glands. If they are the neck glands, let him clean up his tonsils and his teeth. If the crypts of the tonsils cannot be cleaned and kept clean let him have them removed. If the trouble is with the teeth and gums, let them be cleaned and kept clean. If the kernel is in the groin and there is an ingrowing toenail, that must be cleaned up.

Wherever the focus, if it be made right, the glands will get right in time.

Lumps on Neck.—*Subscriber writes: "I have had enlarged lymph glands for two years. Lumps come and go on both sides of my neck. Recently I have felt them in the back of my neck. When they swell they cause considerable pain and stiff neck. I have consulted three physicians. They can't discover anything wrong with either lung, but say these enlarged glands indicate a 'tuberculous condition.' If the infection is tuberculous, what would you advise me to do for it? Would a change of climate, say to southern California, be of benefit? Do the lungs become affected from these glands in time? I am on a farm and live an outdoor life. I am well otherwise, but get run down every spring."*

REPLY.—1. Ask them to make sure of the diagnosis by a blood examination and a tuberculin test. If the glands are tubercular, have them give you appropriate treatment, including tuberculin. As there seems to be a recurring infection, probably your tonsils are feeding tubercle bacilli into your glands.

2. Some, but probably not much. It is better for you to change your tonsils rather than your climate.

3. Sometimes.

4. A good tonic would benefit you.

Hodgkin's Disease Symptoms.—*L. N. writes: "What are the symptoms of Hodgkin's disease? Is it curable? How can it be cured? Are tubercular glands in the neck liable to cause consumption? Are tubercular glands painful? Would an infection from the tonsils be painful?"*

REPLY.—1. Enlarged glands, anemia, general weakness. It is especially liable to be confused with leukemia and with tubercular glands. A blood examination will show whether it is leukemia or not. A tuberculin test will show whether the enlargement is tubercular or not.

2. No.

3. Yes.

4. Yes, moderately so.

5. Yes, moderately so.

Consult Family Physician.—*A. H. writes: "I have a daughter, not quite 14, who is healthy and has never been sick. In the last year she has grown rapidly, but shows absolutely a normal development physically and mentally. Recently we have noticed a little swelling or enlarging of the right side of the throat. Sometimes it is not noticeable, but at certain movements of the head or when she is laughing it will show distinctly.*

What is the cause and what kind of treatment do you recommend to stop it growing, or, if possible, to make it disappear?"

REPLY.—She may have a goiter; she may have enlargement of some of the other glands in her neck. An examination is necessary to determine this; it is also necessary before prescribing. Consult your family physician.

May Need Draining.—*I. C. writes: "I have a lymph gland directly underneath the chin and it stands out prominently when I raise my chin. Do you advise having it cut out? It pains slightly when touched."*

REPLY.—If it is red, soft, and sore it probably contains pus and should be drained; otherwise not. The infection is getting in through your teeth or gums, mouth or lips. Have the focus of infection cleaned up.

Are Easily Cured.—*Subscriber writes: "Are little balls which have come in the neck and are apparently loose from the glands a form of tuberculosis? Fresh air seems to have a tendency to lessen the enlargement, also quiet and rest. No pain is attached. What will they develop into? Are baths and dieting helpful?"*

REPLY.—They may or may not be. Tubercular glands of the neck frequently seem to be "little balls not attached to the glands." Tubercular glands of the neck are usually easily cured and therefore develop into nothing.

Swollen Lymph Gland.—*S. T. G. writes: "I have a swelling on my neck near the ear. I have had it for two months. I have not consulted a physician about it but I think it is a swollen gland. Do you think that has anything to do with tuberculosis?"*

REPLY.—It is a swollen lymph gland, the result of some infection, probably of a tubercular infection. You should have it attended to to prevent it from softening and suppurating. More important still, you should find where the infection is getting in.

Enlarged Lymph Glands.—*Irene writes: "1. I am bothered now and then with lumps about the size of a marble in my neck just under my jawbone. What causes these? 2. Is antitoxin a poison? 3. Does it affect the heart?"*

REPLY.—1. They are enlarged lymph glands. Such enlargement indicates the presence of germs of consumption, or pus, or something similar. The germs get there from the tonsils or from the teeth. By all means have your teeth, tonsils, mouth, and nose looked after.

2. No.

3. No.

CHAPTER XXXI

Ductless Glands

The ductless glands have been a neglected field in practical medicine and surgery. From the surgical standpoint nothing has been done except to improve the method of operation on goiter; to determine when a given case should be operated on or when it had gone too far for an operation to be safe; to remove a few adrenal tumors, and to do an occasional removal of some one of the other glands.

On the medical side more has been done, but not much headway has been made. There were many practical difficulties in the way. It was difficult to get the secretions of the glands for analysis and research; it was difficult to operate experimentally on the glands without disturbing neighboring structures in such a way as to make it difficult to decide what part of the effect was due to the operation and what part of the effect was due to the removal of the gland.

When glands were given by the stomach the first necessity was to know whether the digestive juices broke the gland chemicals up into simple substances and thus made them ineffective. For example, on the one hand, snake poison can be swallowed without injury, because the digestive juices change it to harmless substances; on the other hand, the virus of infantile paralysis when swallowed is probably not changed.

Over growth in stature three influences preside—first, heredity; second, food supply; third, secretion of the ductless glands.

We learn from the Journal of the American Medical Association of some experiments by a physician in New York City who fed tadpoles on thymus and thyroid glands. Those fed on thymus retained their youth and remained immature frogs overlong. Those fed on thyroid began to develop legs at once and speedily dropped their tails. Maturity without much growth was reached ahead of time. It seemed that the impulse to grow came from the thymus and the impulse to mature from the thyroid and these qualities of these glands were not modified by the digestive juices.

If we can apply this to human beings it would indicate that the great, large, gawky, overgrown youths would be helped by thyroid. Those who are small, old before their time, mature in advance of the years for maturity, would be helped by thymus.

However, it is well to bear in mind that ductless gland therapy is now a field of active study and many halfway facts will be discovered from time to time. It will be some years before our stock of information will be great enough to support far reaching or final conclusions.

ACROMEGALY

Growth is not a matter of chance. One determining factor is heredity. A child is born destined to reach a certain size. However, circumstances, such as an attack of summer complaint or measles, may intervene to prevent the child from developing as destined. More than that, the person is destined to grow after a certain fashion until about fourteen; then to radically change his growth so as to fit a new set of specifications; then, at about twenty-five, to quit growing, but to fatten; about the forties to fatten more rapidly; about the seventies to lose fat; and finally, about the eighties, to dry out and shrink.

These changes are not matters of chance. The growth in childhood is due to the secretions of the ductless glands and principally to those of the thyroid (in the neck), the thymus (in the chest, just over the heart), and the pituitary (in the brain, just back of the eyes).

At fourteen, the rapid growth along new lines is due to the absorption of the internal secretion of the sexual glands. The changes in percentage of fat which come later in life are the result of thyroid changes.

Acromegaly is a disease in which the bones grow to giant size as the result of overactivity of the pituitary body. Many of the museum giants are acromegalics. Dock says:

"The sculptures of many French and Italian churches show interesting examples."

Jack the Giant Killer and perhaps also David, who slew Goliath, had rather an easy time of it, as giants are generally weak both physically and mentally, "furnishing more drum majors than academicians," and dying before they reach middle life.

Acromegaly is somewhat different from giantism. One out of every five acromegalics is a giant, and one out of every two giants is an acromegalic.

In acromegaly the bones grow large—sometimes rapidly, sometimes slowly; the brow bulges, the cheeks become prominent, the chin protrudes, the fingers and hands, feet and toes, become heavy and "bony."

In acromegaly the bones grow large at one end and not at another. Certain bones may be enlarged and not others. In fact, it is the unevenness of development which makes the difference between an acromegalic giant and a so-called normal giant.

In acromegaly the pituitary body is found enlarged or overactive, without being enlarged. The gland oversecretion poured into the blood causes certain bones to overgrow.

Some day somebody should discover an antibody to neutralize this secretion or some surgeon should find a way to remove a part of the gland.

Irregular and abnormal growth, whether resulting in giantism, acromegaly, or some less obtrusive deformity, is a fair field for the investigator.

THYROID MALADIES

Lying on the front of the trachea, or breathing tube, just below the Adam's apple and just above the breast bone, lies one of the most important

organs in the body. It is located just under the skin and therefore is easily felt. It is known as the thyroid gland.

The painters and sculptors knew of it in the earlier days of art, for the old Grecian statues and pictures show it plainly; yet the physicians were slow in discovering it. The first medical man to recognize definitely disease in the thyroid was Paracelsus, who wrote on goiter and cretinism about 1500.

The reason for the tardiness with which knowledge of the thyroid has grown is that it is a ductless gland. Its secretion is absorbed directly into the blood stream. The peculiarity which made this gland secretion of the very greatest importance served to hold back knowledge of it. It was not possible to tap a duct, gather the secretion and analyze it, as can be done with the secretion of the duct glands.

Paracelsus, the Swiss scientist of the sixteenth century, was deprived of one of his glands having a ductless gland function. In consequence his skin was smooth and his face grew no beard.

Possibly he had some thyroid disease when he was young, for it is said that he was rickety. Possibly the bony changes of rickets are due to the effects of poor food and poor air acting through some of the ductless glands.

Robinson says that, compared to Paracelsus, "the magpie is shy and the peacock modest." Be that as it may, Paracelsus recognized that the thyroid was an important organ.

The thyroid gland weighs from one to two ounces. It is about two inches long, three-quarters of an inch broad and an inch thick at the thickest part. Shaped like a pair of old fashioned saddle bags, it lies across the windpipe. The two main bodies, called lobes, rest on the sides of the windpipe, and they are joined by a band of thyroid tissue, called the isthmus, lying on the front of the windpipe.

In the ordinary person the edge of the thyroid is about three-quarters of an inch above the top of the breastbone. In some people some part of the thyroid is behind the breastbone in the upper portion of the chest.

The secretion of the thyroid cells is poured into microscopic cysts or tanks and from these it is absorbed by the blood. If the amount of thyroid secretion is just enough and not too much the work of the body is liable to go along about right.

The thyroid is the master gland. More than any other gland it governs the work of other glands. The other organs are tied rather narrowly to their accustomed tasks. The thyroid has special tasks and in addition it has some capacity to help out with the tasks of other glands.

If there be a general infection the thyroid is liable to swell. Indigestion causes it to enlarge. It enlarges during menstruation. Some pelvic troubles in women cause it to swell.

If there be very much of an excess of thyroid secretion the heart beats too rapidly and is irregular; there is a tremor in the hands and the breathing is shallow. The change in the mental state is very striking. There is great nervousness, excitability and general on-edge-ness.

If there is too little thyroid secretion absorbed, the pulse is slow and strong, the skin is thick and dry, and the hair is lifeless. The mind is dull.

The amount of thyroid substance absorption has a great deal to do with size and weight. Children with thyroid deficiency are small. Dr. Hertoghe dwarfed small animals by removing their thyroids in their early youth. He caused dwarfed animals to grow larger by the use of thyroid.

Children with an excess of thyroid are nervous and learn and grow rapidly.

As people approach the meridian of life the thyroid begins to show the effects of its great activity during the earlier years. The pathologist says that there is an overgrowth of the framework of the organ, the interstitial tissue—a sign of wear.

The person says he is getting bald, is taking on weight, is less aggressive mentally, and that his judgment is better. The physician puts together the testimony from the two sources and says that the thyroid is secreting less.

When the thyroid oversecretion is enough to bring the condition into the realm of disease the name given is hyperthyroidism, or too much thyroid. If the thyroid is enlarged, the condition is called goiter. There can be goiter without the on-edge-ness due to hyperthyroidism. There can be hyperthyroidism without any goiter.

If the absorption of thyroid secretion is too small in amount the condition is called hypothyroidism. If the deficiency is very great the condition is known as cretinism. A less marked stage is called myxedema. If the amount of secretion is still nearer normal the condition is known as partial myxedema.

In cretinism the gland is very small and the amount of secretion is almost at the zero point. In consequence none of the life processes goes right. The subjects are somewhat dwarfed in body and very much dwarfed in mind.

Cretins are such by inheritance. In fact, heredity is a prominent factor in both goiter and cretinism. Of cretinism, the Sardinian Commission reported: "Sometimes cretins are born to cretinous parents. Sometimes the children of such parents have no more than a disposition toward cretinism."

In a considerable group of people there is a temporary condition known as partial myxedema. In others this condition of slight hypothyroidism is persistent. French described six groups of people who suffer from partial myxedema as follows:

"1. Certain infants who without being true cretins, present symptoms of idiocy.

"2. Certain backward children between two and five years of age showing various symptoms, of which the two most familiar are slowness in learning to talk and delay in learning to walk.

"3. Growing boys and girls suffering either from general mental backwardness or a persistence of the habit of wetting the bed at night.

"4. Certain stout, sterile women of the child-bearing age.

"5. Certain females at or about the menopause who have rapidly become too stout.

"6. Sufferers from certain nerve affections which closely resemble and are frequently called neurasthenia and tic douloureux."

There is no better way to discover that a given condition is the result of too little thyroid than giving thyroid for a while and noting the effect.

If the physician who is observing the case notes that the symptom

is disappearing he is justified in feeling fairly sure that hypothyroidism was the underlying cause. For instance, if a child is noted to be months behind in walking or talking, or if a boy wets the bed years after he should have stopped, there is evidence enough to warrant a trial of thyroid.

Belladonna, worm medicine and scores of other remedies have been tried in vain, for none of them is worth anything for bed wetting. Thyroid, under proper control, is worth a trial.

An idea of another type of thyroidism can be had from a description of a case given by Dr. Barton in the *Journal of the American Medical Association.*

A woman forty-four years of age, the mother of three children, noticed that she could not comfortably put on her shoes or her gloves. Her feet and hands would swell and stay swollen for a while, then the swelling would go down. Examination of the urine showed that she did not have Bright's disease. This came on slowly and lasted for four years.

Then she noticed that she was getting stout; her mouth was feverish; she felt cold when others did not, and her hands and feet would "go to sleep" easily—in fact, they had that feeling most of the time. Her skin was dry, glossy, and rough, and she never perspired. She had pains in her legs, especially when she went up and down stairs.

In time her gait became very wabbly. Her memory became poor, she spoke slowly, and was disposed to cry a good deal.

Her lips thickened a little and her tongue swelled. One consequence of this trouble with her lips and tongue was that her speech got a little thick. For instance, she pronounced *s* as *sh.*

From her speech, her gait, and her mental impairment the neighbors got the idea that she was mildly intoxicated most of the time.

Finally she went to a doctor and had a thorough examination made. He found a stout woman whose weight had recently increased from 170 to 189. The lips and tongue were thick and stiff. There was enough of the appearance of dropsy in the skin to blot out the lines which ordinarily give expression to the face. At the same time there was no typical dropsy.

She said she sat at a window for hours at a time, aimlessly looking out. Her mind was clear, but there was no snap to it. Her speech was thick. Her pronunciation was a mild imitation of that of the stage drunk.

Dr. Barton decided that she was not suffering from Bright's disease. The near dropsy in the face and legs was suspicious but there were no albumin or casts in the urine. He decided that she was suffering from partial myxedema.

He gave her two grains of thyroid extract three times a day. Her pains kept up for several days. Then she had flashes like a woman passing through the change of life.

Then her disagreeable symptoms began to clear up and within a few weeks she was a well woman again. That is to say, she was well in so far as her symptoms were concerned. Her thyroid deficiency was permanent. At her time of life that could never be cured.

After she had got over her symptoms her dose of thyroid was reduced to one two-grain tablet a day. That dose she will probably be compelled to keep up until her other organs have grown as old in structure as her

thyroid is. She may be able to leave it off when she gets to be an old woman but not before.

Of the six groups outlined by French those in Nos. 4 and 5, having begun thyroid, will probably need to continue it for many years. The members of Nos. 2 and 3, being young, should only take thyroid long enough to get well started towards cure. The elasticity of youth ought to bring them out and should be given a chance to.

The members of group No. 1 will need to take thyroid longer than those in groups 2 and 3. How long will depend upon how near they are to being cretins. The members of group 6 must be guided by the circumstances of the individual case.

In those days when the only variety of hypothyroidism known was cretinism thyroid, deficiency was thought to be a very rare condition in this part of the world. Then came knowledge of the milder condition, myxedema, but still the condition was regarded as rare. Then came knowledge of partial myxedema.

Now it is known that a minus thyroid condition may complicate almost any disease condition. It may cause various kinds of aches and pains, various kinds of mental disturbance, and various symptoms that appear in other diseases, but which are the result of lack of thyroid. A few days of thyroid treatment may unravel more than one puzzling case.

Fortunately the discovery of the remedy preceded the full knowledge of the disease. Thyroid extract bears much the same relation to this disease that quinin does to malaria or antitoxin to diphtheria.

Difference in Goiters.—The general run of people are very well informed about goiters. They know a goiter when they see one. They even know how to protect themselves against goiter fakes of various sorts. Those who have goiters are not indifferent about them. In fact, as a rule, they are rather more uneasy than the danger warrants. There is need for information on which to base judgment as to which of the goiters need treatment and especially which need surgical treatment.

The thyroid gland goiter is very apt to enlarge as a result of disturbance somewhere away in the body—disturbance with the digestive organs or with the pelvic organs, for example. Plainly it would be a mistake to operate on such goiters. Whatever treatment is given should be given the organs in which the disturbance is located. The thyroid is not at fault, except it be a fault to help out.

In young men and women it is not infrequent to see a certain amount of enlargement of the thyroid, but with no symptoms. These cases do not require treatment, either medical or surgical. The young woman who does not like the "looks" given her neck should console herself by remembering that the beautiful women painted and chiseled by the Greek artists had some simple goiter.

If the goiter is pressing on important nerves or other important structures in the neck and causing either cough or suffocation operation may be called for.

People older in years sometimes have simple goiters without any symptoms. The goiter is there and that is all there is to it. Most of these cases require no treatment, medical or surgical. If in such a case the goiter

grows rapidly, or gets very large, or produces pressure, or causes cough, operation may be called for. A good surgeon must decide the question.

The goiters for which good judgment is required, if the ship is to be properly steered, are what is known as toxic goiters. In the toxic goiter cases the subjects are nervous and flighty. The heart palpitates, races a while, and then pounds hard and slowly. The hand trembles. Breathing is shallow. In some of the cases, perhaps half of them, the eyes bulge and much of the white of the eyeball shows. The superficial observer sees the bulging eyes easily. It is for this reason that the name *exophthalmic goiter* is given to this disease. Some cases in which the eyes bulge do not show the other signs of poisoning.

The essential signs of thyroid poisoning are the mental excitability, nervousness, the tremor of the hands, the nervous heart, the nervous digestive organs, and the bulging of the eyes.

Some of these cases can be cured without operation. Antithyroid preparations, iodin preparations, electricity locally, resting in bed are the measures which succeed in some cases. Most of them need operation.

Good judgment is required to decide when to operate and when not to operate. A case may pass quickly from an operable to an inoperable stage. Some inoperable cases can be treated medically and brought back to the point where they are operable.

The Thyroid Gland.—When you encounter an unduly irritable, flighty woman and are upset by her unreasonableness, before you condemn her notice the size of her neck. She may have a goiter and by that token be entitled to your patience.

When you encounter a logy, heavy, phlegmatic man, before you condemn him, think of the possibility that he is a cretin or cretinoid and entitled to your help.

There are glands like the liver and kidneys that take chemical substances out of the blood and discharge them from the body. They have been well studied, because it is easy to collect their secretions, to examine them chemically, to look at them under the microscope, and to inject them into animals. These glands are important just as the garbage man is important.

There are other glands, called ductless glands, which secrete substances that are poured into the blood stream, not out of it. These glands are important just as the milkman is more important than the garbage man.

The most important of the ductless glands is the thyroid—a gland located on the front and sides of the neck just above where the collar is worn. The thyroid secretion is poured into the blood and by it is carried to all the tissues of the body. When the gland is wholly removed, death results in a few days. When a child is born with too little thyroid it is dwarfed physically and mentally, the limbs are short, the skin thick, the lips protruding—the child is idiotic, it hears and sees poorly and comprehends imperfectly.

So much for those having far too little thyroid secretion—the cretins, the cretinoids, and, perhaps, the Mongolian idiots.

Those having far too much thyroid have bulging eyes, a flushed face, irregular pulse, a flighty, irrational, illogical, quick, nervous, fidgety mind, asthma, and nervous diarrhea. Below this, which is the extreme, there are

cases which grade all the way down through exophthalmic goiter, goiter thyroid enlargement, goitrous states, hyperthyroidism—through inexplainably nervous people to the absolute normal.

Having established as a base line the man into whose blood the thyroid gland is pouring just the right amount of secretion each day and who in consequence is well nourished, well developed, well muscled, not obese, and whose mind works coolly, calmly, collectedly, alertly, judiciously, we recognize men and women both above and below, some in low and others in the high registers, and still others in the deep basses.

Cretins.—It is probable that there always have been cretins. The ancients had a habit of deifying that which they could not understand and, therefore, stood in awe of. Dr. Parrot says that the ancient Egyptian god, Ptah, especially venerated at Memphis, was a cretin. An examination of the models of this god in the Egyptian galleries shows that he was big bellied, squat, with short limbs—not unlike a cretin. At the present time there is no romance and no legend attaching to the cretin. He is just plainly unfortunate in having less than his share of thyroid gland, or a thyroid gland secretion which is less rich than it should be.

Most cretins are born with so little gland that they are doomed to cretinism; a few acquire this deficiency. There are parts of Switzerland where cretins abound. In a district in Styria there are 1,045 *cretins for every* 100,000 *population. In certain parts of Austria the rate is* 71 *per* 100,000. *In Piedmont, Lombardy, and Venetia there are* 12,882 *cretins in a population of* 9,565,000. *In this country there are a fair number of cretins, but far less than in the region of the Alps.*

Going above the line, we get into a field of greater interest.

If the Egyptians worshiped a cretin god, the Greeks showed a fondness for those with an excess of thyroid. Greek statues were usually modeled after men and women with enlarged thyroids. The earlier Roman art, among other ways, showed the influence of the Greeks in that the women portrayed had necks that were overfull. If this evidence is to be accepted goiter was frequent and not a thing to be ashamed of in those early days.

Goiters.—Goiter occurs so frequently as to make it worth while considering. Majet says that in France there are 400,000 people with goiter. Ewald said that 12,277 recruits were rejected for goiter in Switzerland in three years. Hocher says that 80 per cent of the school children of Berne have it. Munson found that one in fifty Indians had it. Dock found a lot of it around the Great Lakes. Adami found that in certain French Canadian villages about two out of every thousand had goiter. Of the young women, 10 per cent had it.

A slight projection in the lower part of the neck is frequently seen, especially in women, on the streets of Chicago and generally among the people of the upper Mississippi valley. Many of these cases have not only enlarged glands but also the prominent eyes which designate them as exophthalmic. Some are goiter, some exophthalmic goiter.

The amount of disturbance is not proportionate to the size of the gland. The real cause of the trouble is the pouring of too much or too rich thyroid juice into the blood. While we naturally expect a big gland to make more juice than a small one sometimes the little fellow is the more active of the

two. The large gland may be made up mostly of gristle and the little fellow mostly of secreting cells. A gland that is not too large may slip around in front of the muscles of the wind pipe and seem to be larger than it is, or it may slip back under the muscles and appear to be smaller than it is—in fact, may be hard to see at all. It may be so situated that it catches, pinches, squeezes nerves or blood vessels, causing the eyes to protrude, the breathing to be asthmatic, the face to flush, or it may be so placed that it does not pinch. Whether or not it does many of these things is a matter of chance. The real question is: Is the thyroid gland over- or underactive?

The cause of goiter has not been worked out to the complete satisfaction of anybody. Many causes have been discovered. No doubt these are factors, but nobody has given to these different factors their proper values.

One of these causative factors is the drinking water. There is much reason for believing that water is of some importance as a causative factor; another of some importance is the soil. Osler's "Practice of Medicine" tells us that the belief that water causes goiter goes back as far as Pliny, and is to be found in Africa, India—in fact, in all parts of the world. In several places in Italy and Switzerland whole goitrous districts have been improved by getting water from a nongoitrous region.

Then we have some pretty good proof that while some goiter comes from water, some is inherited. Occasionally it breaks out in epidemics in schools, barracks, and neighborhoods. Some develop from mental strain, some about those times in life when the body is undergoing profound changes, particularly adolescence and change of life.

But much more important than any other cause is inheritance. Hirsch says: "There is very nearly unanimity among observers that goiter is transmitted by inheritance. That cretinism is influenced by inheritance is now quite generally accepted. The Swiss, acting on this view, regulate marriage among those with thyroid abnormalities. This procedure is eliminating cretinism from certain highly cretinous districts. Goitrous families are prone to contain a number of cretins.

What is to be done about it? What can a person with thyroid do?

Certain of them are operative cases and no other course is open to them. Goiters, just as certainly as cancers, pass into an inoperable stage. After the thyroid has for years poured a daily poisonous dose of secretion into the blood there comes a time when no surgeon is justified in operating. The nervous control of the vital processes, particularly the heart action, gets to be so badly impaired that operation is unwarrantably dangerous.

No surgeon is justified in operating on a case of goiter unless he has kept watch of the case long enough to know the patient as well as his goiter, and no patient with goiter is justified in allowing himself to be operated on, or even to take an anesthetic for any purpose, until the anesthetist and the operator have had a chance to size up the entire situation. Therefore, any woman who has goiter should carefully consider lest she pass from a stage where operation is advisable to one where operation is inadvisable.

Can anything be done for those who have too much thyroid but are not in need of operation? Yes; much can be done in teaching them how to control themselves, how to maintain an equilibrium. Various drugs have

been used with benefit in certain cases. In the main these are made from other ductless glands—those that are supposed to be antagonistic to the thyroid. One is made from the milk of goats whose thyroids have been in part removed.

What can be done for those that have too little thyroid? Fairly satisfactory results follow continued giving of thyroid gland and various kinds of extract of thyroid gland. Preparations of iodin, especially organic iodin, are valuable. The thyroid secretion is rich in iodin. But the trouble is that these are only remedies. They must be kept up as long as life lasts. If stopped, the patient relapses. Now, this is tiresome and quite unsatisfactory.

Therefore, surgeons occasionally take a thyroid from a lower animal and implant it into a cretin or a cretinoid.

Of the greatest interest is the subject of moderate hyperthyroidism and hypothyroidism—people who are irritable, nervous, and flighty because they have not much thyroid, or who, because they have too little, are phlegmatic and heavy. Some, being young, have too little and are undersized, or, becoming old, are having their thyroid shrink and are, therefore, getting obese.

While we do not have many cretins in this country, we do have many phlegmatic, thick skinned persons who are suffering from thyroid deficiency. When there is a poor bony development the thyroid may be at fault. Small people are usually such as the result of inheritance but occasionally a person is undersized without having this as an explanation.

This is a great field for the immediate future. Those who know most know little enough. Even when it comes to questions of cause and prevention there is need for more information.

That there is a goiter inheritance has been proven abundantly. That in goitrous districts cretins abound has been proven. Acting on the few known inheritance facts, the Swiss government is greatly reducing the goiters and cretins in the districts where they are working. That water, soil, fright, emotional states are factors is known, but the information is only half information. We need more study of the cause of goiter and cretinism and greater effort by the government to control the ramifications of thyroid problems.

However, let us bear this in mind: those who are afflicted with having too much thyroid and those who have too little, as well as the slightly goitrous, are entitled to more kindness and patience than they receive.

Enlargement of Thyroid.—There is goiter and then again there is goiter. There are cases of goiter in which the constitutional symptoms are profound and the only course, if life is to be saved or if the patient is to be spared confirmed invalidism, is prompt operation.

In another group of cases the disease progresses slowly but inevitably, or nearly so, toward the stage in which the only help is operation. Another group of cases responds well to thyroidectin and similar preparations taken internally. This article does not deal with these groups.

In a routine examination of 800 people applying for positions in three branches of the civil service in Chicago, in 1914, Dr. E. T. Olsen found goiter present in a surprisingly large percentage of the cases.

In one series of 449 women 69 were rejected on account of goiter.

This was 15.37 *per cent of the whole. Analyses of the nativities and ages of these women showed nothing out of the ordinary. It seems probable that somewhere about* 15 *per cent of all the women of Chicago have enough of a goiter to be somewhat affected thereby.*

In another series of 157 *examinations of women there were* 32 *rejections on account of goiter—*20.38 *per cent. In a series of* 193 *examinations of men there were* 13 *rejections on account of goiter—*6.72 *per cent.*

If you are a Chicago woman there is one chance in seven that you have goiter. If a Chicago man, your chance is one in sixteen.

From the state of Washington comes a similar report. The probability is that goiter is not especially abundant in either of these regions.

These surveys have merely revealed conditions that are about average throughout the country. The fact is the thyroid gland is an important organ. Whenever anywhere in the body any organ is put under stress there is a fair chance that the thyroid may enlarge by reason of its efforts to help out in the extra strain. Therefore enlargement of the thyroid is frequently an indication of trouble somewhere else in the body.

If a woman has pelvic trouble, uterine trouble, or pus tubes or abscess of the broad ligament her thyroid may enlarge.

I know one physician whose digestion is poor and who has an enlarged thyroid. By eating cautiously he has managed to keep down his thyroid trouble for years. With him his thyroid is a barometer showing the condition of his digestion.

The *Journal of the American Medical Association* quotes a Swedish physician, Norregaard, who studied the relation between the thyroid and conditions of the adenoids and tonsils. From a careful study of thirty-five cases he concluded that whenever thyroiditis develops there is a focus of infection somewhere in the body, and the most frequent location is the tonsils.

Therefore whenever he found a case of thyroid enlargement he first carefully examined the throat. If no source of trouble was found there an examination of all the organs was made. It is only a short distance from the tonsils to the thyroid. Any infection can easily travel the route.

In some animals there are direct channels from the tonsils to the thyroid. Weglowski carefully examined 153 human cadavers, finding in 50 direct routes from the tonsils by which bacteria could have readily traveled to the thyroid. But even if Weglowski had failed to find any small tubes the relation between infection of the tonsils and enlargement of the thyroid would have stood. There are no tubes between the pelvic organs, the appendix, the gall-bladder or the digestive organs and the thyroid. The point is that enlargement of the thyroid is often merely a card which reads: "Trouble here; look for the cause."

Goiter—Endemic.—*When the thyroid gland enlarges or gets unduly active, the condition is called goiter. This gland, located in the lower part of the neck, is extremely important. Just enough of its secretion is necessary for health. Too much causes a train of symptoms.*

The number of people in Switzerland with thyroid out of balance—too large or too small—is great. In Aosta a large part of the people had small thyroids. The condition was getting worse as the years went on until the

inheritance factors were recognized. The marriage of cretins was prohibited, whereupon cretinism began to lessen in Aosta.

Every now and then a goiterous condition runs riot through a community. The condition becomes epidemic (or endemic). Scientists studying some of these endemics thought the spread was due to water. They said that water from certain types of soil caused it.

This idea that water causes goiter is widespread. It is extensively believed in this country. In fact, I think most people accept the water theory as a fact.

Scientists never thought water had anything to do with the ordinary types of goiter. It was only in the goiter endemics, regarding the localities where nearly every woman and many of the men had goiter, that the water was thought to be the cause.

The Hygienic Institute at Zurich says that water has nothing to do with goiter. In their study the investigators examined 6,000 people. In one town 77 per cent of all the people had goiter. In another, two-thirds of the people were affected. In certain families all the members had the disease. Here were endemic conditions beyond a doubt.

Examining the source of the water carefully, the experimenters found that it did not come from the rock strata supposed, for some of the original studies had been made in these towns and the whole theory was based on the presumption that the water came from a certain rock formation.

The next experiment was with rats. Ordinarily rats do not have goiter. Rats caught elsewhere and exposed in the epidemic localities got goiters. It made no difference whether they drank boiled water or water from other sources or water from the local supply, goiter developed just the same. Rats kept in another district but fed on water from a goiter district did not develop goiter.

It became evident that goiter is slightly catching in a goiter district. But it is not spread by water. Something else in wide use in such a district spreads it.

What it is is not known. This does not mean that there is danger of spread by water, air, or anything else in a district where goiter is somewhat rare, where, say, less than one in one hundred has goiter.

Battling with Goiter.—When a person has a goiter, he or she should be in good hands, medical or surgical—sometimes one, sometimes the other. Such a person is one who has bulging eyes, enlargement of the thyroid, irregular, rapid pulse, muscular tremor, and diarrhea. All of these are symptoms, or at least two or three of them are.

However, outside of this group are a large number of people who are not much disabled now and hope not to become disabled. They want to know what they can do.

A while ago I was lunching with an intelligent physician whose thyroid was plainly enlarged. He ate carefully. He told me his trouble had existed for years; that it did not discommode him much. He had noticed that if he were careful of his digestion he had little trouble. By eating small meals, selecting his food with discretion and chewing carefully he kept himself in good shape. Should he be indiscreet he paid the penalty.

Dr. Hemmeter, a most excellent physician of Baltimore, tells in the

Journal of the American Medical Association of having controlled three troublesome cases by attending to the digestion. Generally speaking, he keeps his patients, for a while at least, on a meat-free diet. He washes the lower bowel every day with from a pint to a quart of a one per cent solution of ichthyol. No one should try the ichthyol without having a physician to keep track. Some patients take sour milk and Bulgarian bacilli.

After the symptoms had stopped he had the three patients in question keep up cold baths and sleep twelve hours a day, or rather stay in bed twelve hours a day. The colonic flushings were given about once a week.

The people who have a slight amount of goiter can well see to it that they do not develop chronic constipation. If they can get their bowels in perfect habit they may not need enemas. But rather than allow constipation to continue they should take plain large enemas.

It would be better still for them to go to their physician or a clinic for a course of medicated enemas. They should look to their diet and their method of eating with especial care. Hemmeter advises plenty of rest.

In addition, McCarrison would take proper steps to see that the drinking water is not befouled by sewage or human contamination. If the water has been contaminated, boiling it will help.

McCarrison, though, holds that it is not wholly satisfactory to boil water as a protection against goiter. He believes so thoroughly in intestinal disorders as the cause that he gives his cases courses of thymol somewhat as they treat hookworm people. That part, however, the ordinary person had better leave alone, at least for the present.

This much is certain: It is not enough to know that one has a goiter. Before anything should be done it is advisable to analyze still further. The diagnosis should include the kind of goiter. Mayo, Plummer, and Wilson have shown plainly that there are different kinds of goiters, and what is required for one kind is quite different from the requirements for another kind.

Some goiters start out to poison the nerves and protrude the eyes. For these operation is inevitable, and delay may result in the case becoming inoperable.

In another group of cases the thyroid enlarges because it is necessary that it should do so in order that it may do the work thrown on it.

Many goiters in women result from disease in the pelvic organs. Attention to the underlying condition brings about improvement in the goiter.

The evidence is good that chronic infections of the nose and throat at times result in enlargement of the thyroid and increase in the amount of thyroid secretion in the blood. Dr. Beebe tells us that in goiter patients between sixteen and twenty-four, from 35 to 49 per cent will give a history of repeated attacks of tonsillitis.

Then, if a person has goiter he should first find out whether his goiter belongs to the group which results from some diseases elsewhere in the body.

If it does the search must be to find where the trouble is. In this search the condition of the nose and throat must be investigated.

If the tonsils are found diseased, it is the opinion of other physicians as well as of Dr. Beebe, they should be removed.

Effect of Gland Changes.—*A child is born with a large ductless gland*

called the thymus. This gland remains large during the years of rapid growth. About the time the rate of growth of the young person becomes slower it begins to shrivel. While it is not certain it looks as if the growth impulse in part lies in the thymus gland.

About puberty there is a second period of rapid growth. The shape of the figure changes, the bones of the face change so as to alter the expression. The body changes are widespread and profound. Simultaneously, there is activity in the ductless portions of the sex glands. The presumption is strong that the structural changes of adolescence are not matters of chance or accident but are the result of glandular activity.

When the pituitary gland is overactive some of the bones or some parts of some of the bones grow large. When there is a large thyroid gland, the subject is dwarfed, physically and mentally. When most of the thyroid is removed from a young animal, the animal develops legs and bones so changed as to amount to a deformity. On the other hand, when young animals are fed thyroid they grow large and have heavy bones.

Men and women past forty begin to accumulate fat—they become obese. An examination of the thyroid made during the same age period shows it is becoming senile. Thyroid, skillfully used, is of service in reducing obesity in this group of people. Their obesity can be reduced by regulating their food without giving thyroid, but the use of thyroid permits of greater leeway in dieting.

When the thyroid is markedly diseased definite intoxication results. The subject is mentally irritable and as the intoxication progresses other symptoms develop. When the adrenals are in part destroyed low blood pressure and Addison's disease result. When there is not enough of a certain pancreatic secretion diabetes results.

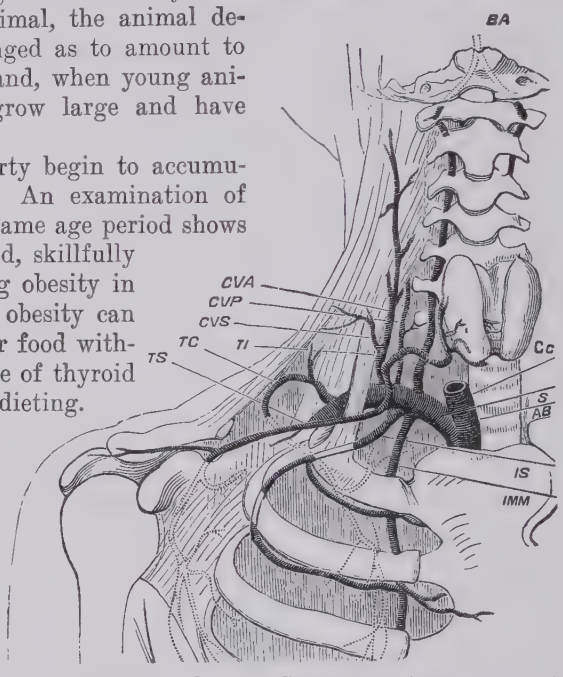


Fig. 196.—Thyroid Gland. Subclavian Artery (to arm) and Some of the Branches. Common Carotid Artery (to head and neck). AB, the innominate; Cc, the common carotid; S, the subclavian; BA, the basilar; MMI, the internal mammary; IS, the superior intercostal; CVP, the deep cervical; TI, the inferior thyroid; CVA, the ascending cervical; CVS, the superficial cervical; TS, the suprascapular; TC, the posterior scapular.

Knowing these facts physicians lay the foundation for much more knowledge of the effects of changes in the secretions of the ductless glands. Here and there in a medical society papers are being read, and research is being recorded. Occasionally an essayist will report a plain matter of fact series of observations on the effect of changes due to altered secretions of the ductless glands. About this report there will be nothing dramatic, no "story." Such a report is no sixteen story building—it is just a brick—but of just such plain, undramatic bricks, tested, tried, and then laid

one by one, is the sixteen story building constructed. Many observations are needed before our knowledge of the more subtle effects of moderate duct gland changes will be anywhere near satisfactory.

Enlarged Thyroid Glands.—*"A number of girls have been eagerly watching your articles for anything you might have to say regarding goiter or enlarged glands. Among a club of thirty young ladies, fourteen have these enlarged glands. Three are taking treatment, thus far without much result, and the others would if they had the money to take treatment.*

"Now, then, my own case, which seems to be about the same as some of the others, is as follows: About one year ago I noticed that if I did much long distance telephone talking my jaw would ache and my throat hurt me more or less. Many nights I would go home with a 'jaw ache.'

"I have a slight inclination to double chin, and I have been accustomed to throwing my head back while I sleep at night to overcome, in a measure, this tendency. I have thought there may be a slight possibility that this has something to do with my throat enlarging.

"During the day my throat does not bother me, but at night, after I take a hot bath before retiring, my throat throbs. Would a hot bath before retiring have a tendency to increase the size of the goiter?

"Can you tell us what causes these glands to enlarge at the front of the neck? Can you tell us of anything we can do to keep them from increasing in size? Is there not some simple remedy or some diet?

"One of the girls has been so affected by heart trouble, which the doctor says is caused by goiter, that she has had to quit work and go to bed.

"Now we have heard that a doctor by the name of W. Thompson Bobo, M. D., a goiter specialist at Battle Creek, has a cure for goiter. Can you tell us anything about his claims? Do you know anything about this treatment, and would you recommend it to us as worth trying?

"We shall eagerly watch the papers for what you have to say. Do give us some advice. This is an important matter to us.—A. L. M."

Reply.—Some of these girls probably have enlarged glands due to absorption from the gums, tonsils or nose. Such enlargements are well to one side and several inches higher than the thyroid gland. The thyroid is in front and also to the side and reaches from just above the breast bone to a point about three inches above it.

The thyroid gland secretes a most important fluid. When the demand for this fluid is exceedingly great the gland secrets an extra amount, and in consequence it may enlarge. It is a good way from a gland moderately enlarged to do a moderately increased work to the goiter conditions that we need to be disturbed about.

The enlargement is unsightly and causes some sense of fullness but the effects to be watched closely are due to the gland juice acting on far away organs. They are great nervousness, nervous unrest, nervous instability, rapid, irregular heart action, shallow breathing, diarrhea and protrusion of the eyes.

I am sure that the majority of the girls in this group are unduly disturbed by their thyroid enlargement. The girl who has had trouble so bad that "she has had to quit work and go to bed" probably belongs in the group where the thyroid has got out of relation to its work.

Some of these cases get right back on their keels when given some form of antithyroid. Some need to be operated on. Just which belong in each group is a difficult question requiring the best judgment of medical men.

However, that is the small group. The larger part of your friends have thyroids slightly enlarged because they have increased work for the thyroid to do. It is pretty well agreed that digestive disorders cause the thyroid to enlarge—where the teeth are bad and the food is badly masticated, when the food is of poor quality, when there is a good deal of fermentation, but, above all, when there is constipation. To remedy any of these conditions is to remedy this mild form of goiter.

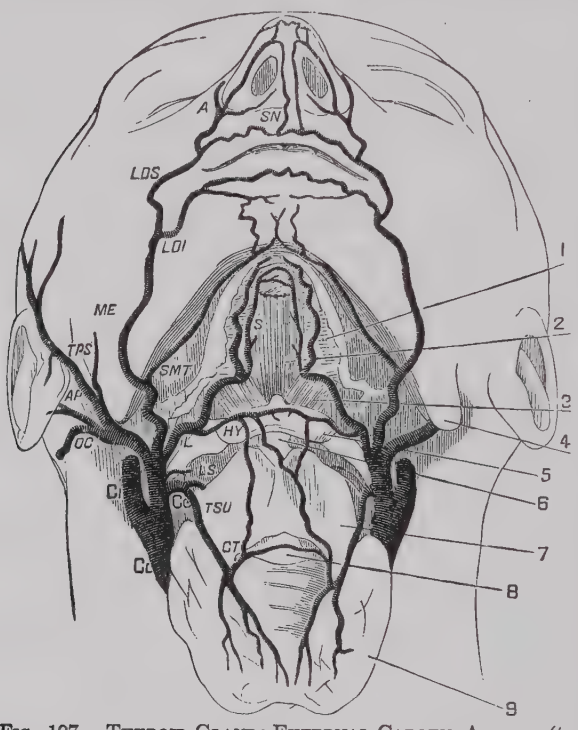


FIG. 197.—THYROID GLAND; EXTERNAL CAROTID ARTERY (to the head and neck) AND SOME OF ITS BRANCHES. Cc, common carotid; Ce, external carotid; Ci, internal carotid; TSU, superior thyroid; LS, superior laryngeal and cricothyroid; HY, hyoid branch of the lingual; S, the sublingual; ME, the facial; SMT, the submental; LDI, the inferior labial; LDS, coronary of upper lip; SN, the a. of the septum narium; A, the angular; OC, the occipital; AP, the posterior auricular; TPS, the superficial temporal; 1, the tongue; 2, the genioglossus muscle; 3, the hypoglossus; 4, the angle of the lower jaw; 5, the hyoid bone; 6, the thyrohyoid ligament; 7, the thyroid cartilage; 8, the cricothyroid membrane; 9, thyroid gland.

The old French writers grouped a lot of causes together and called them causes multiples. They referred to such unhygienic conditions of life as defective air space, bad food, bad living rooms built on damp grounds.

McCarrison has written a book on the cause of goiter in which he tells the result of years of study. The conclusion which he arrived at is that water is largely responsible for goiter.

The water responsible is not water containing certain mineral ingredients as was thought formerly. It is polluted water, water that has soaked through soil contaminated by human beings. This means that where the goiter rate of a community is high there is danger of much typhoid.

Another secondary factor generally recognized is fright or any other form of mental strain. Prolonged mental strain such as worry and overwork at monotonous, grinding, mental labor may be a cause.

Answering the question in the last paragraph of your letter, Dr. Bobo has been exposed in "Nostrums and Quackery." He is connected with the Peebles epilepsy cure and in close touch with a circle of fakers.

Thyroid Gland.—*W. P. F. writes: "1. Where is the thyroid gland? 2. What are its functions? 3. What are one's symptoms when it is deranged? 4. What should be done?"*

Reply.—1. On the front part of the neck just above the collar line.

2 and 3. It secretes a juice that is poured directly into the blood stream. This secretion has several functions. When it is deficient the child does not grow properly. The man who grew from childhood suffering from such deficiency is small, short limbed, thick skinned, and dull and heavy mentally. When there is too much secretion the subject is flighty, nervous, and excitable.

4. Depends on the nature of the derangement. Some cases of goiter yield to rest, control, and medicine; some need to be operated on. All cases of thyroid derangement gain from systematic, scientific medical control—seeing the medical advisor at proper intervals.

Treatment of Goiter.—*B. T. writes: "Will you kindly let me know your opinion of the value of horse or sheep serum in the treatment of goiter? If recommended, what dose should be taken and how long would it take to effect a cure? The patient has the usual symptoms of nervousness, instability, slightly bulging eyes, and palpitation of the heart. Can you also tell me of the relationship between goiter and marriage; also insanity?"*

Reply.—Sheep serum for thyroid, called antithyroidin, has been used with advantage. Better reports come from the use of thyrodectin, the dried blood of an animal from which the thyroid has been removed. Proper attention must be paid to diet and water.

Take my advice and get good medical counsel and follow it. Do not worry about insanity.

Davenport says of goiter: "It is clearly inherited, as certainly as epilepsy." Not many pedigrees seem, however, to have been studied.

See Best Surgeon.—*C. B. S. writes: "I wish advice about goiter and curing goiter. I have had it possibly ten or twelve years. I am 25 years old. Do you think it can be cured? If so, what cure would you advise? Does age or length of time one has had it make any difference? I have heard of a woman who says she can cure me in nine treatments. She gives three treatments each month for three months and treats in a certain time of the moon. What is your advice about a doctor of this kind? I know of cases she has cured, but want your advice."*

Reply.—1. Go to see the best surgeon available and get his advice.

2. Operation is generally required for cure.

3. Yes.

4. Do not waste your chance to get well on that kind of foolishness.

Enlargement of the thyroid gland, called goiter, calls for skillful handling. Many cases are of no especial importance. Other cases are bad at the start, then get better, then slowly proceed into a condition where the wise surgeon will not operate. The condition is then hopeless.

Thyroid Intoxication Case.—*E. W. R. writes: "A woman, now 64 years old, developed an exophthalmic goiter five years ago. At first there was violent palpitation of the heart and pain in the chest so severe that morphin and whisky were needed. These spells kept up for four years. A year and a half ago, she went on a farm, and began leading a simpler life. Now the symptoms are less severe, the attacks are rare, and the goiter is nearly gone. Two weeks ago the head got wrong. There is a tendency*

to fall over and a constant throbbing in the right ear. The blood pressure is 200. Is this a forerunner of apoplexy? What is the trouble? Is staying in bed the proper course?"

REPLY.—1. No.

2. You have been suffering from thyroid intoxication. Within the last two years you have become partially accustomed to your dose of thyroid. It is possible that your symptoms are due to a temporary increase in thyroid secretion. It is probable you have some condition in your semicircular canals in your right ear. Your physician should examine carefully for this condition.

3. Yes.

May Not Need Treatment.—*Mrs. S. C. E. writes: "Will you kindly tell me what will be helpful to know about goiter? My sister has had one since childhood, but it has never grown large. She is teaching school now, and is nervous. Would a weak back be a cause, effect, or neither, of a goiter? Physicians have told us an operation is the only cure, but our own physician, who has treated her for years, says an operation is not necessary. We are much alarmed about it, especially when considering her nervous condition. We fear such a delicate operation. Can it be cured in any other way?"*

REPLY.—If the goiter has been present for many years and has given no symptoms until now it will in all probability require no treatment. Most school teachers work in badly ventilated schoolrooms and they get tired and nervous before June. Having a goiter she would get nervous more easily than a normal person.

Try the effect of prolonged and thorough rest. If rest does not quiet her she may need an operation.

Medical and electrical treatment sometimes succeeds. The medical treatment consists in the proper use of iodin and electricity locally and tonics and antithyroid preparations internally. Just how long it is safe to postpone an operation while trying rest and medicine will require the best judgment of your physician.

Goiter and Children.—*A. L. writes: "What, in your opinion, as far as children are concerned, is the danger in two people marrying when each has goiter? Neither was inherited, but both developed. Neither party has ever been incapacitated by it for work, but each is possibly more nervous than the ordinary person. Both persons otherwise may be termed fairly well. Would the child of such a marriage run a greater risk of being a little more nervous than most children? Would the child be more liable to have epilepsy than any other child? Would it run any risk of being defective mentally? Is there any possibility that it could be up to par? Would the danger of childbirth, the woman being 25, be any greater than to anyone else?"*

REPLY.—1. Yes.

2 and 3. No.

4. Yes, probably would be.

5. Yes.

The children of an extremely nervous couple will probably be nervous but if they are trained in the control of nerves they will average up well.

Regarding Goiter.—*Miss N. A. D. writes: "1. Will you please tell me what causes goiter? 2. Some say it is more prevalent in some localities*

than in others, and that the drinking water causes it. 3. Does painting the goiter with iodin or something of the kind prevent it increasing in size? 4. Are operations for goiter dangerous, and what kind of goiter and under what conditions should they be operated on?"

REPLY.—1. Goiter is an enlargement of a gland in the neck called the thyroid. Nobody knows what causes it to enlarge.

2. It is more prevalent in some localities than in others. Boiling the water as a means of controlling its spread is often recommended. Whether it is of any value I do not think anyone knows.

3. No.

4. A careful examination of each case is necessary to determine.

Graves' Disease.—*J. L. T. writes: "Kindly explain what Graves' disease is, its cause, symptoms, and general course. Is it related to heart disease? Can it be cured?"*

REPLY.—Graves' disease is that form of goiter in which the eyes bulge. One of the important symptoms is an irregular and highly nervous heart. My advice to you is to consult the best available physician and abide by his advice.

When to Remove Goiter.—*T. R. S. writes: "Would an operation for goiter be considered advisable if the goiter is not only hereditary but long standing? Should it begin to grow rapidly, would an operation be considered advisable? Have there been any discoveries as to causes and remedies for this trouble more recent than the study you gave some months ago?"*

REPLY.—1. Neither heredity nor long standing is an indication in itself for the removal of goiter. Rapid growth is an indication. Goiter should be removed when the general nervousness, heart nervousness, and other constitutional symptoms of thyroid intoxication indicate it.

2. Much study is being put on goiter. The journals are filled with articles in connection with it. Nothing epoch making has recently appeared.

Operation Often Necessary.—*M. B. B. writes: "I am 26 and have a goiter. Is it incurable? I have tried electrical treatments and see no improvement. Would you advise an operation? Are such operations serious? Please tell me what causes a goiter."*

REPLY.—Many people are relieved of goiter symptoms due to too much thyroid secretion. Sometimes they get better because they get accustomed to their dose of thyroid secretion; sometimes the gland secretes less; sometimes medical treatment cures. Ofttimes nothing cures except an operation. Which are the cases for operation, when operation should be done, and when it is too late for operation are questions that can only be answered after a careful study of the individual case. Get the best advice available and abide by it.

Goiters Grow Smaller.—*Mrs. E. L. W. writes: "Will you kindly tell me if goiters ever disappear entirely without an operation? I have never used any drugs or treatment of any kind, yet mine seems to be getting smaller. I am just thirty years of age. Do goiters affect the heart in any way?"*

REPLY.—1. Goiters not infrequently cease to be troublesome; not infrequently they get materially smaller. The thyroid gland, when enlarged, is called a goiter. This gland is necessary. If it were to disappear entirely grave results would follow. Some thyroid juice is a good thing; too much poisons one. If one becomes accustomed to too much thyroid the goiter ceases to be troublesome. To decide which cases are trending to the worse and which to the better requires the best of judgment.

2. The goiter heart is one of the most frequent and most troublesome goiter symptoms.

Goiter.—*E. W. writes: "1. Are cases of Graves' disease sometimes found in which the eyes do not bulge? 2. Is a woman with a goiter in more than ordinary danger in childbearing? 3. Is goiter cured by thyroid extract, or is it merely kept under control? 4. In cases of goiter which show a growth on the outside can anything except an operation reduce the enlargement?"*

REPLY.—1. There is goiter without bulging of the eyes more frequently than with it.

2. Yes.

3. Goiter is usually harmed by thyroid extract.

4. Medication will do it sometimes, though not often.

Goiter Not Contagious.—*H. M. D. writes: "Will you kindly say whether there is any chance for one afflicted with goiter to communicate it to another through intimate association? What is the most effective treatment one can use to relieve the great suffering one experiences following a severe and general case of sunburn?"*

REPLY.—1. There is none. Sometimes goiter is abundant among people but the element of contagion is not a factor.

2. Where the surface is not broken, wash with cold soda water; dry with soft cloth, and dust with talcum powder. To grease with cold cream is pleasant. If the surface is broken, wash with sterilized, normal salt solution; dry thoroughly, and dust with talcum powder, then cover with aseptic gauze. Sterilized vaselin makes a good application to a raw surface.

Cause and Cure of Goiter.—*S. A. writes: "Please give cause and cure for goiter."*

REPLY.—The causes of goiter are many:

1. Inheritance.
2. Nervous shock.
3. Worry.
4. Water.
5. Soil.
6. Development out of relation.

The cures vary with the cases:

1. Operation. Most satisfactory and suited to many cases; unnecessary in some; inadvisable in others.
2. Iodin preparations.
3. Milk from animals with small thyroid.
4. Electricity.

In every case high-grade medical advice based on adequate observation is essential.

Treatment for Cretinism.—*A. C. A. writes: "Some weeks ago Chicago papers printed an article about a man and wife who are cretins and stated that their children were being treated by the city of Chicago. I have a friend in another city whose little girl is small for her age. Her parents took her to Minneapolis for examination, and the doctor there told them she would never grow taller than, possibly, three or four feet. On reading about this family of cretins, I wondered whether this case might be similar and, naturally, would like to bring the matter before my friend, if there is any chance for the child."*

REPLY.—First find out if the child is deficient in thyroid—is a cretin. If she is she should take one of the preparations of thyroid. There are many on the market.

Thyroid must be used for a long time. It must be intelligently used. In young cretins treatment is fairly satisfactory.

Life of Cretin.—*J. W. D. writes: "About what age do cretins attain? What is the maximum age?"*

REPLY.—Untreated cretins die young. It is rare for one to reach thirty years of age.

I have never seen any statement as to the maximum age.

Operation Not Dangerous.—*Mrs. H. N. S. writes: "I have a small goiter which has been troubling me. In case I decide to have it removed are such operations dangerous? Also are such operations expensive, and how long would I be kept in bed? I am a working woman."*

REPLY.—If you are in good condition, and I judge from your letter that you are, the operation is not dangerous. If you have a frank understanding with your surgeon your bill will be in keeping with your capacity to pay. Such operations cost nothing for those not able to pay. They cost little for those able to pay little; they cost much for those able to pay much.

Goiter and Medicine.—*Mrs. H. P. writes: "Can a goiter be destroyed by medicine?"*

REPLY.—The more efficacious of the goiter medicines act by neutralizing the excess of thyroid secretions. In a certain sense they are antitoxins. Therefore they must be continued so long as the excessive secretion of the gland continues.

In some cases goiter can be kept under control by attention to the digestion; in others by attention to the pelvic organs or by medicine; other cases require operation.

Thymus Gland Tablets.—*J. S. B. writes: "Have taken thymus gland tablets for rheumatism of the finger joints with some encouragement. Will you please state what these tablets are composed of?"*

REPLY.—The thymus gland is a ductless gland located just above the heart. It is quite large at the time of birth; in fact, it may reach up into the neck. When the young person is about ready to stop growing the gland shrinks. It has much to do with growth.

Every young animal has a well developed thymus gland. The butcher commonly calls it "the sweetbread in the neck." The tablets are composed of dried thymus gland taken from pigs and calves.

THE ADRENAL BODIES

If one judges by the name of these organs he concludes that they are related to the kidneys. They are located near the kidneys and from this nearness they have drawn their name, adrenal, or their other name, suprarenal. Though sitting on the kidneys like an illy adjusted nightcap, they have no other relation to them. Their work is in no way related to the work of the kidneys.

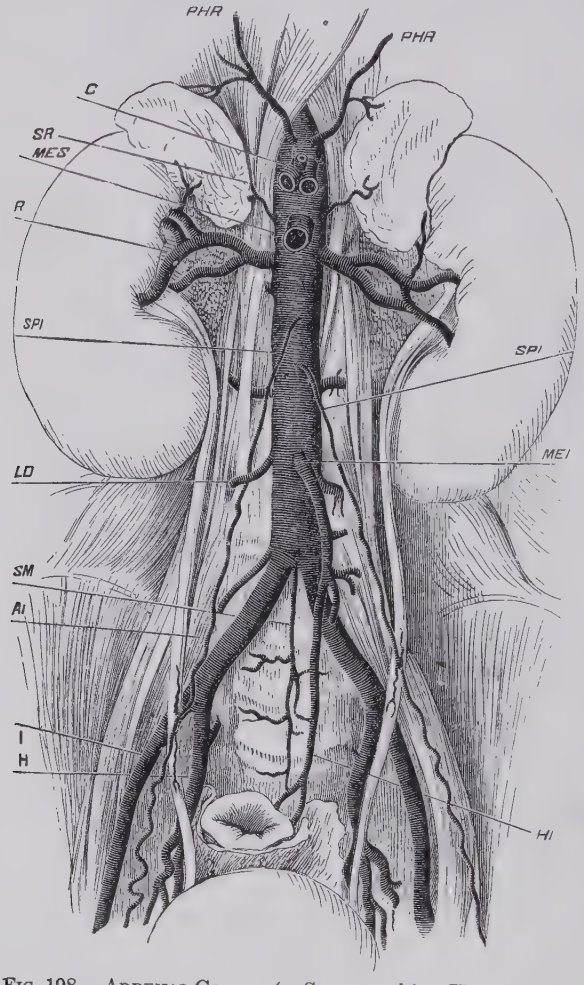


FIG. 198.—ADRENAL GLANDS (or Suprarenals). KIDNEYS, ABDOMINAL AORTA AND SOME OF ITS BRANCHES. Ai, common iliac artery; I, external iliac; H, internal iliac; SM, middle sacral; PHR, inferior phrenic arteries; LD, one of the lumbar arteries; C, the celiac; MES, the superior mesenteric; MEI, the inferior mesenteric; SR, the capsular; R the renal; SPI, the spermatic; HI, the internal hemorrhoidal.

The kidneys are the body sewer or an important part of it. The work of the adrenal has to do with the distribution of the blood to the different parts of the body. As the adrenals are being formed in the body of the unborn child they are placed next to certain nerve cells that have to do with the size of the blood vessels. As development proceeds the bunch of adrenal tissue and the group of nerve cells grow together to form the adrenal body.

When in mature life the adrenal cells secrete, a part of the secretion acts on the next door nerve cells and a part of it flows into the blood stream and is carried to nerve cells elsewhere throughout the body.

Each of the adrenals is about an inch and a quarter by an inch and three-quarters in size and weighs about a dram. Anatomically, the adrenals are not imposing. They are small and inconspicuous.

Unlike the secretion of the kidneys the secrtion of the adrenals cannot

be drawn from the living body and made the subject of study. Owing to the difficulty in studying the adrenal secretion it is only in recent years that anything had been known of its effect on the human body. We are just beginning to learn of the discomforts, disabilities and diseases which result when the adrenals go wrong.

At a meeting of the American Medical Association Dr. Williams of Washington told the section on practice that he no longer recognized neurasthenia as a disease; that it was a lazy, sloppy diagnosis and that there was always some abnormality somewhere in the body. He said when a physician diagnosed neurasthenia he had used the term "merely as a convenient cloak for failure sufficiently to investigate."

In his experience, when these cases have been carefully and patiently studied, it has been possible to discover some abnormality in some organ somewhere. In some of them there is organic disease in the more frequently considered organs. After placing these cases under their appropriate heads he finds a large number of ordinarily considered neurasthenics whose trouble is with their adrenal glands. He bases his conclusions upon such experimentally proved facts as the following:

Cannon found that after fright the vein running from the adrenal gland contained too much adrenal secretion. Everyone has noticed that fright causes the skin to pale, the amount of blood in the skin to decrease, and goose flesh to form. These effects are closely related to an increased discharge of adrenal secretion into the blood stream. Crile proved that prolonged fright caused a continuously excessive secretion of adrenal secretion.

The ordinary term for prolonged fright is anxiety. Anxiety, worry, and fright cause an oversecretion by this gland, and this oversecretion causes a train of symptoms, some of which are prominent in neurasthenia.

There are cases of so-called neurasthenia which are purely mental. These divide themselves into insanities and the neurasthenias. The body is influenced by the mind. There are cases of so-called neurasthenia in which the mind is under the influence of the body. Among this group are some cases of neurasthenia in which the cause lies in the adrenals. These have the ordinary mental indecisions, worries, anxieties, and fears of the neurasthenic accompanied by low blood pressure. Sometimes the skin bronzes.

One such man felt that he could not carry responsibility or manage men; he could not come to a decision. Feeling that his usefulness was at an end he feared he was losing his mind and in consequence was greatly depressed. When he was examined the only abnormality found was a low blood pressure. He was told that he was not losing his mind; that his blood pressure was low because he did not have enough adrenal secretion; that his low blood pressure meant a poorly nourished brain.

From this came his indecision, his worries, fears and anxieties. Because he took no exercise his muscles became flabby and his flabby, soft muscles made him tire easily, resulting in poor circulation—a vicious circle. His blood pressure was 100. For a man of his years this was quite low.

Under adrenal tablets, rest, exercise, and diet his blood pressure came up to 114; *he became physically fit, quit worrying and got back his old decision and managing ability.*

Another man, fifty-seven years of age, had indecision, weakness, dizziness,

and throbbing in the abdomen—the usual symptoms of neurasthenia—with a low pressure—108. The same line of conduct plus adrenal tablets cured him.

Another, a man of forty-four, had had headaches for six years whenever tired from using his eyes. A dull, aching pain at the end of his spine would often be so severe as to waken him at night. There was nothing the matter with his eyes, and he tired when he was read to as well as when he was reading. His blood pressure was 114.

Another case, a woman, was low spirited, melancholy, anxious, and mentally depressed. Her pressure was 106. Her skin was pigmented.

Another, a man of forty, had worried until he was run down so much that he had lost his self-control. He did not want to work; he fatigued easily; he had nervous indigestion and insomnia. He was due to marry in three weeks but the prospect horrified him and he wanted to go and hide. His blood pressure was 102.

Another patient worried all the time. He said: "My mind feels as a shadow only and for two years nothing has seemed real." He had indigestion, flatulence, dizziness and headache. He had a weak, flabby feeling, especially in his arms. His skin was pigmented. His blood pressure was 102. In another case, a woman of 34, the pressure was 86. The skin was pigmented.

Most persons have a fair knowledge of the symptoms of neurasthenia. From every standpoint, this is for the best. Neurasthenia is sometimes called Americanitis. It is also frequently referred to as "the American disease." The indications are that it is on the increase. It is inheritable. The children of neurasthenics are somewhat liable to be neurasthenics.

What is of more importance, neurasthenia, hysteria, insanity and criminality are often found jumbled up in a family strain in such a way as to indicate that these plants grow rather interchangeably out of a common soil—a nervous mental makeup in which there is lacking poise and a proper understanding of one's relation to one's fellow men.

One writer, albeit only an indifferent authority, goes so far as to propose nation-wide intermarriage between Italians and Americans. The basis of his suggestion is that when the overtense, unromantic American crosses with the underambitious, overromantic Italian there will be progeny in which there will be just enough of tenseness and just enough of romance to make a masterful race, devoid of tendency to neurasthenia.

This is referred to to show that the inheritance phases are being discussed. It is for the best interest of the individual neurasthenic to have neurasthenia known.

Three years ago when the neurasthenic wrote me about his symptoms, they were to him very important. To him they always meant organic disease. He was anxious; he worried. He commiserated with himself and he abused anyone who did not appreciate the gravity of his complaints.

The general tone of the letters from neurasthenics has changed. They still have symptoms; they still worry; they are still anxious but now they frankly acknowledge that they are neurasthenic; that their symptoms do not proceed from that which they dread; that their stomach symptoms do not mean cancer, for instance. At the same time they are unable to throw them off. It is along this line that they search for help.

To recognize that a group of symptoms means neurasthenia is the first

step toward cure. The above list of symptoms will be recognized by neurasthenics. It is for the best interests of neurasthenics that the people know the symptoms of neurasthenia.

Under the old order neurasthenics were always misunderstood and were commonly neglected. There was a certain period in which the family shared the anxieties of the worried one. In this period the family's commiseration, added to the individual's commiseration for himself, made a combination that was hard on the neurasthenic. It generally landed him in a state of invalidism.

This period was commonly followed by that in which everybody disregarded every complaint of the neurasthenic. Thus he was driven in on himself all the more. Since nobody would pay any attention to his symptoms he must nurse them the more. Since time had proved that he had some illness of which he had complained and to which no one had listened, he was right in all of his complaints and his heartless associates were wrong. It is best from the standpoint of community life.

Neurasthenics are not incapacitated for business. Ours, the masterful nation of the last five centuries, is the neurasthenic race. Not all of this is in spite of neurasthenics. Neurasthenics have contributed to progress. They engage in the keen competitions of business.

It is wise for business competitors to understand the workings of the neurasthenic mind. To the average business man this is more important than to understand the relentless logic of the Rockefeller mind. In literature neurasthenics have been prominent.

It is for the best from the standpoint of medical men. Physicians have had little patience with neurasthenia. They had been so often misled by the symptoms of neurasthenia they had fallen into the habit of disregarding the neurasthenic wherever they could. Like a hunting dog who, having often investigated promising trails and found that they led to nothing, finally became indifferent to all trails, the physician, listening to a story of symptoms and recognizing exaggeration and self-commiseration as earmarks of neurasthenia, loses interest and worms out as easily as he can.

The present medical tendency is to dig deeper into these cases. As the result of digging deeper many are found to have a physical basis. Some are found to have early stage Bright's disease or anemia or some other fairly well known disease. Some are found to have trouble with the ductless glands.

We are just beginning to know about the relations of the ductless glands to health and comfort. In the discussion of Dr. Williams' paper Dr. Starkey said that when a patient suffers from lack of force, inefficiency, lack of decision, easy fatigue, melancholia, the trouble lies with the ductless glands.

The more important of the ductless glands are the adrenals, the thyroid, the pituitary, the thymus and the sex glands. The secretions of these glands in health are in exact balance. When the balance is lost ill health, discomfort, or bodily disorder of some sort results. When the disorder takes the bent which forms one of the varieties of neurasthenia extracts of several of these glands should be given.

He made a therapeutic suggestion which embodies a rather far reaching thought. He said the ordinary commercial preparations of thyroid, adrenal, and so forth, are made from castrated animals. When an animal is unsexed

the entire structure of that animal is changed. We know of the difference in the texture and flavor of the flesh, of the difference in the mind and spirit of altered, as compared with unaltered, animals.

"The change from the bull to the ox and from the cock to the capon are conspicuous and familiar examples," he says. "The change that takes place in their organs of internal secretion is just as marked, so that the chemical composition and the physiological action of glands obtained from spayed animals are very different from those derived from unspayed ones."

ADRENALIN

Adrenalin and other preparations made from suprarenal gland have been known to the medical profession for a long time. They have been in general use for more than ten years. The remedy can be procured from any drug store.

Adrenal substance and extracts of adrenal substance are powerful medicines. We strongly advise that they be not promiscuously taken. No one is justified in using adrenal substance until, first, careful consideration has proved his case a proper one, and, second, provision has been made for supervision during its use.

ADDISON'S DISEASE

Suprarenal or adrenal extract has long been in use to stop hemorrhage and temporarily decrease local congestions.

Sixty years ago an English physician, Addison, reported a disease in which the skin turned brown, until a Caucasian became as dark as an Indian or mulatto and in which there was tuberculosis of the adrenal glands. Since that time it has been found that any cause which slowly destroyed the adrenals would cause Addison's disease to develop. For instance, old, neglected peritonitis, appendicitis which has caused extensive adhesions—either of these can cause it if the adrenals happen to be caught in the contracting scars. Nevertheless, much the most frequent cause is infection with tubercle bacilli.

When tubercle bacilli are swallowed in milk, they may get into the blood and go to any part of the body. However, they usually locate and develop somewhere in the abdomen. Occasionally they locate first in the adrenals or near by whereupon the skin turns brown and Addison's disease is under way. The blood pressure falls to 80 and sometimes 60, the weakness is profound, the blood loses in richness and death finally ensues. The cause of the disease is that the blood does not get as much adrenal secretion as it needs.

When the adrenals are removed or are rapidly destroyed, the blood pressure also drops, weakness is profound and death ensues, but pigmentation does not develop. This last sign results when the supply of secretion is moderately diminished, not entirely stopped.

The treatment of Addison's disease is the use of some of the forms of adrenal preparations and the care of the symptoms. In a large proportion of the cases no treatment is satisfactory.

There is great need for study, work and investigation on the curative side of Addison's disease. There is greater need for study of the relation between the secretions of the thyroid, thymus, sexual glands, pituitary, adrenals and

possibly other ductless glands, to learn where they antagonize and where they complement each other.

There are but few people who develop Addison's disease and, from the standpoint of this disease, the adrenals are scarcely of interest enough to warrant this space. But a large part of the people are mildly adrenal plus or minus and the greatest need of study is that information may be made available for these. We do not know as much as we should about high and low blood pressure and the relation thereto of the adrenals.

RAYNAUD'S DISEASE

This disease at its worst is a kind of dry gangrene, causing the loss of the affected member in a few weeks. A milder and more frequent form of the disease follows about the following course: During a cold spell, an ulcer appears on a finger or toe and, without being exceedingly sore or suppurating, the tissues crumble away until a joint (bone and all) is gone, or an entire finger or toe.

Some moderately severe cases will consume a winter in developing this far, whereupon the wounds will heal, but the disease will recur when cold weather comes again. Each season will take a finger, toe, ear or nose, as toll. This type of the disease has little or no tendency to destroy life.

Osler compares the series of phenomena in Raynaud's disease to what takes place when the hand freezes—the skin first flushes, then gets blue, then turns pale, then dead white, stiff and without feeling. This, the stage of local syncope, is due to spasmodic contraction of the blood vessels.

In order to keep the blood from freezing the vessels are emptied. If this keeps up necrosis or local death ensues. If it is not kept up blood comes back into the veins. The skin becomes livid and mottled. This is the stage of local asphyxia. Soon arterial blood comes in, the hand becomes livid and swollen, and the fingers throb with pain. This is the stage of active hyperemia.

These different phenomena but with no freezing to explain them are what happens in Raynaud's disease. They are logical when the vessels are trying to keep the blood from freezing but when they develop without an adequate temperature reason the mechanism of the body has gone wrong. Raynaud's results from a continued spasm of the muscles which make up the walls of the small arteries. Why the spasm? No one knows.

But for every typical case of Raynaud's disease going on to the loss of joints there are thousands of minor manifestations of the same type but in a mild form. Chilblains, cold feet and even some cases of red nose and enlarged veins in the face are mild manifestations of the same type of disorder. Perhaps persisting cold feet is also a very mild manifestation. Another mild disorder somewhat akin is chilblains in which the blood supply of the feet, having been low, is suddenly increased.

As the blood comes back some fluid escapes from the vessels and blisters are formed. Another form noted by Osler is the beefsteak hand—cold, clammy, swollen, chapped, hyperemic hands. Another is the beefsteak cheeks

of gouty men. Another is seen in the cheeks of full-habited men with red, cyanosed faces and twigs of blood vessels showing here and there.

These mild manifestations may not, and usually do not, lead to serious conditions but even the mildest of them are abnormalities. If we could learn the underlying principles of Raynaud's disease we would know the underlying principles of less important conditions. If we could control these inconveniencing minor conditions it would help in the solution of the problem of Raynaud's disease.

Raynaud's Disease.—*Mrs. H. B. writes: "What is the cause of 'Raynaud's disease' and what can be done to cure it?"*

REPLY.—Nothing is known as to the cause of this disease. It is usually found in women between ten and thirty years old. It is worse in cold weather. It has some disposition to run in families. Sometimes there seems a relationship between it and gout and sometimes it seems related to goiter. No cure is known. A mild form, showing itself by frequent chilblains in cold weather, with beefsteak hands, feet and hands which go to sleep and muscle cramps, is closely akin to gout. For this mild form the proper plan is to keep the hands and feet warm and to live so as to avoid gout.

Symptoms of Raynaud's Disease.—*N. E. B. P. writes: "What are the symptoms of Raynaud's disease? I have a constant numb feeling in finger ends of left hand, a dried out, burned feeling of entire hand."*

REPLY.—Undue paleness or redness of the fingers and toes. Later, ulcers and sometimes gangrene affect the toes and fingers. Sometimes a toe or finger is destroyed by the disease. It gets worse in cold weather and better in warm weather. In mild cases the fingers and toes chill, pain, and become pale or dusky when the weather is not cold enough to warrant it.

Nails Turning Black.—*N. O. C. writes: "Kindly explain why the finger nails turn black. The flesh recedes from the nail, is much inflamed, and at times causes great pain. The nail grows in ridges and seems infected at the root. No pus or dirt under the nail, but at times a dry powder on top of nail. Have been this way over a year, starting with middle fingers, the inflammation often reaching the second joint. The nail becomes very black, turns light, then black again."*

REPLY.—Have your physician see if you have Raynaud's disease.

White Finger Ends.—*J. G. K. writes: "What is the cause of dying finger ends? They turn white and stiff when cold. Is there any effective treatment?"*

REPLY.—I judge you have Raynaud's disease. If so, the condition is not to be treated lightly. Put yourself in the hands of a physician.

CHAPTER XXXII

The Spleen

Everyone knows the location of his liver. The spleen is placed in the corresponding position on the left side of the body. Like the liver, it is tucked away just below the diaphragm under the arch of the ribs and in front of the kidney. Being much smaller than the liver, it is lodged up under the ribs so that it cannot be felt at the rib edge, but when it is enlarged enough to become somewhere near the liver's size it can be felt on the left side, just as the liver can be felt on the right side.

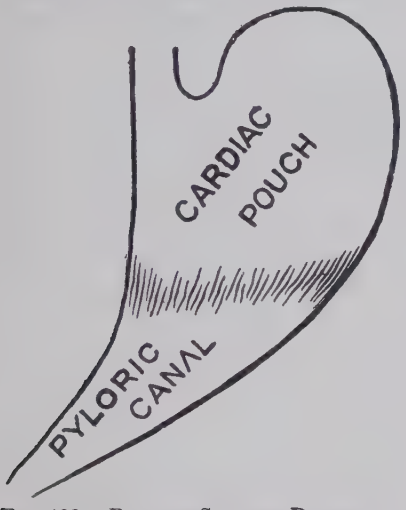


FIG. 199.—DIAGRAM SHOWING DIVISION OF STOMACH INTO TWO PHYSIOLOGICAL PARTS.

I venture to say most people do not know that they have spleens. The spleen does not hold the center of the stage except when things are going wrong. In long continued malaria the spleen, called now an ague cake, large and heavy, is felt as a dragging mass in the left side of the abdomen. In leukemia it is so radically changed that any observer can feel it as a hard, tumor-like mass.

The spleen is a blood gland. In a certain sense it is the only blood gland.

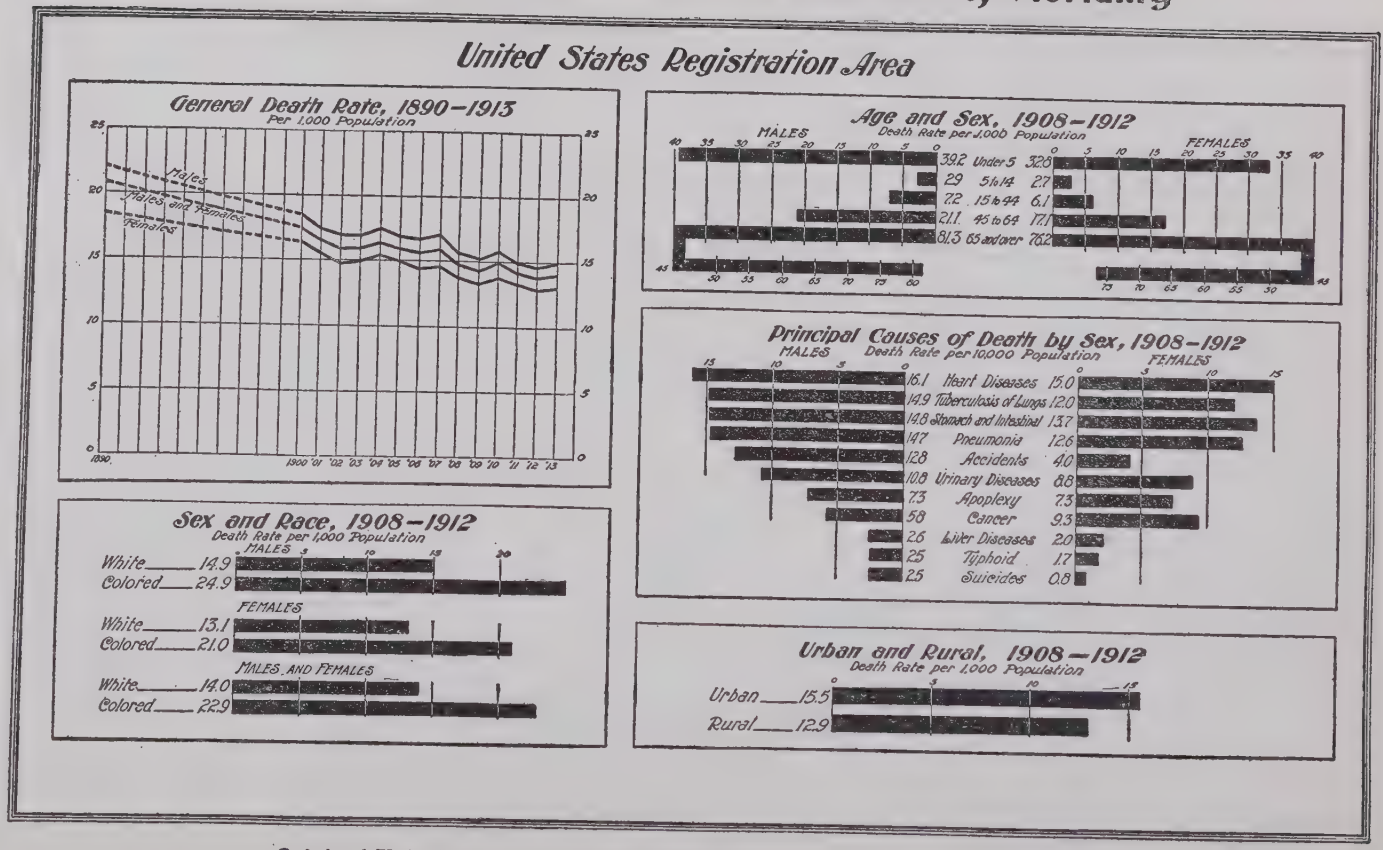
The lung is one kind of blood gland. The black, venous blood flows in the arteries to the lungs and there meets the air from which it picks up oxygen and into which it pours out smoke or what corresponds to smoke. In that it changes the blood it is a blood gland.

In a certain sense the kidney is a blood gland. Into it the blood, charged with waste, is carried by the arteries. The kidney cells remove urea and other waste materials and discharge them down the waste duct, and the purified blood flows in the veins back into the general circulation.

The lungs have ducts, the bronchi, through which waste discharges. The kidneys have ducts through which waste discharges. The spleen has no ducts. Its cells act on the blood in the vessels, change it in some way or other, and the changed blood flows on through the vessels.

It is easy to catch the air as it flows from the lungs and analyze it, and in that way get an idea as to what is the work of the lungs. It is easy to analyze urine and judge of the work of the kidneys. It is not impossible to drain the gall-bladder, gather the bile, analyze it, and get an idea of the work of the liver.

American Public Health — Elements of Mortality



Original Tabulation by The Prudential Insurance Company of America

FIG. 200.

There is no spleen secretion to analyze and getting a line on the work of the spleen has been hard.

The blood vessels to the spleen are large for so small an organ. They divide and redivide until the thick walled arteries have delivered their blood into their thin walled branches, called arterioles. From these the blood flows into thin walled tubes called capillaries, and from these right among the spleen cells themselves.

The blood, after it gets among the tissues of the spleen, is in great lakes in which are islands of spleen cells. In these lakes the blood no longer rushes forward. It comes into the spleen tearing away under torrential speed. It begins to slow up soon after it gets in. In the capillaries it flows gently.

In the lakes it tides back and forth like water in a lake, gradually traveling from where it enters to where it flows out, but without any inlet to outlet current that anybody can find.

The water flows into Lake Michigan from the mouth of the St. Joseph. Some day that same water will flow out through the "Soo," but if one observed the direction of the flow on any given day he would be quickly liable to find it towards the mouth of the St. Joe River.

This lake effect gives the spleen cells a good chance to act on the blood. As the blood passes through the lungs it is always moving from the arteries to the veins. As it travels through the kidneys it keeps on the move. Yet the effect of these organs on the blood is important.

How important then is the work of the spleen? What is that work? We know a part of the answer, but probably only a part.

In those diseases where germs circulate in the blood, the spleen enlarges. In anthrax, about the first bacterial disease of which we knew the bacterial cause, the bacteria gets into the blood, and in consequence the spleen enlarges. In fact, one of the names for anthrax is splenic fever, while the Germans call it *Milzbrand,* or spleen disorder.

The large rodlike bacillus is carried by the blood to the spleen, where the spleen cells get to work trying to destroy them. As the work required is prodigious, the spleen cells rapidly multiply. The spleen would get quite large in anthrax if the patient lived long enough, but anthrax is rapidly fatal.

In typhoid fever the typhoid bacillus circulates in the blood. The spleen rallies to the rescue. The extra work calls for extra cells. The spleen enlarges in typhoid. It often becomes large enough to be felt below the border of the ribs.

In pneumonia the coccus gets into the blood. It circulates everywhere. At once the spleen knuckles down to work. Before the work is over the swollen, tender spleen can be felt at the border of the ribs.

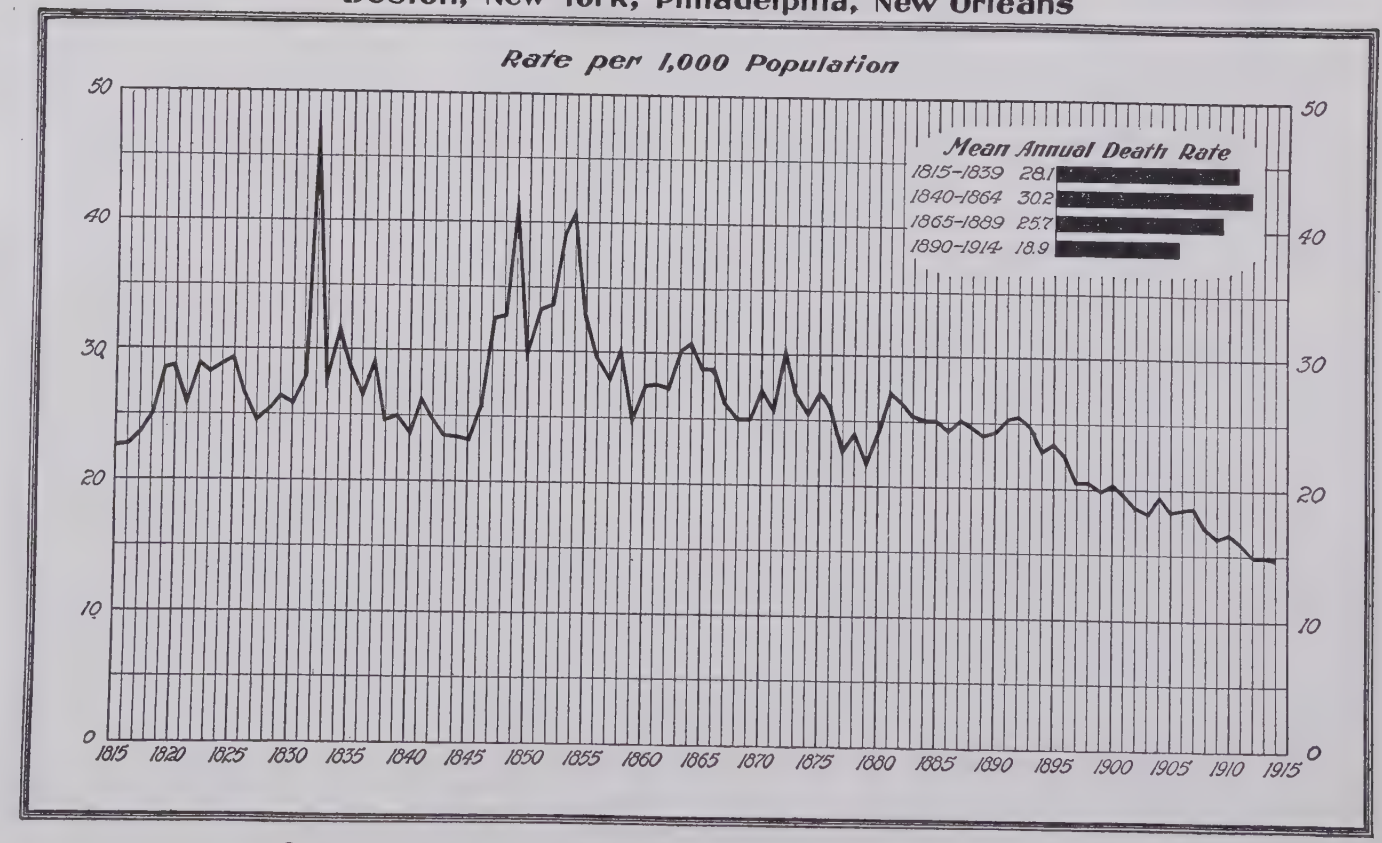
In syphilis the spirochetes get into the blood. They circulate widely. There is fever and a skin rash. The spleen gets to work. It swells. Within a few weeks the secondaries have passed. The spirochetes are no longer in the blood; they are out in the tissues. The spleen is not under strain; it goes back to normal size. After that, as long as the spirochetes keep out of the blood, the spleen keeps down; whenever they get in the spleen enlarges.

In septicemia and pyemia, or blood poisoning, the pus cocci are circulating in the blood and the spleen increases rapidly in size.

This evidence is enough to convince us that one of the functions of the

The General Death Rate of American Cities, 1815—1914

Boston, New York, Philadelphia, New Orleans



Original Tabulation by The Prudential Insurance Company of America

Fig. 201.

spleen is to remove from the blood the bacteria that get in it. As long as the number is small the spleen removes and destroys them and gives no sign to indicate that it is on earth.

In olden times, when everything about the body was speculative, it was claimed that the spleen was the seat of ill humor. In consequence, the term spleen was used as synonymous with anger. We spoke of ill tempered men as "having the spleen" or being "splenetic." How it came about one can scarcely understand, since the origin is so free from ways of speaking.

There are several conditions that cause the spleen slowly to enlarge and to remain large for a long time. In chronic malaria the abdomen enlarges and one can feel a large, firm spleen pushing from under the ribs. This is the fever or ague cake.

The malarial parasite passes through two forms. In one form the organism causes regular, periodic chills and fever. In this stage it is easily killed by quinin. In this stage the spleen is also busy killing the parasite, but it is not exceedingly adept at the job, and in consequence this organ swells less in three weeks of malaria than it does in three weeks of typhoid, or in ten days of pneumonia.

The malarial parasite, after about sixteen days, begins turning to the sexual form. In this stage chills and fever are irregular. The parasite is not so easily killed by quinin. The spleen does the best it can to rid the body of the parasites. In consequence it enlarges, though slowly.

Whenever a person has ague cake, two things may be taken as certain. The first is that the malarial parasites in that man's blood are in just exactly the right stage to infect mosquitoes. The second is that it will take considerable time to rid him of malaria, for the parasites in that stage are not easily killed.

If a community cannot afford to do all the things necessary to rid it of malaria it can cut the disease in half or decrease it even more than that by doing one thing—providing care until completely cured for every person having an ague cake.

In leukemia there is a great enlargement of the spleen. The large, firm, notched tumor can be easily felt. We know little about the cause of leukemia. We know that it is a slow disease; that at times the forces defending the body are able to hold the invaders at a standstill for years; that the cause, whatever it may be, is combated by the one-nuclear, white blood cells, for these are found present in great excess; that the multi-nuclear white cells, the best fighters of the blood cells, are of no service in the fight, and that the quality of the blood is lowered until it is exceedingly watery.

This group of facts makes it plain that leukemia is due to a mild infection with some parasite; that the parasite is a blood parasite, though it may have its principal holdout in the spleen, as does chronic malaria. Probably the parasite is not a coccus, but is more nearly like the malarial parasite or the syphilis parasite. Some day somebody will identify this parasite and then the research to find a cure will start on a scientific basis.

The spleen gets large in ordinary consumption, because the blood is poisoned for months by the large number of germs that absorb from the cavities in the lung; in suppurative pleurisy from the same cause; in inherited syphilis because the spirochetes are in and out of the blood.

Figure I

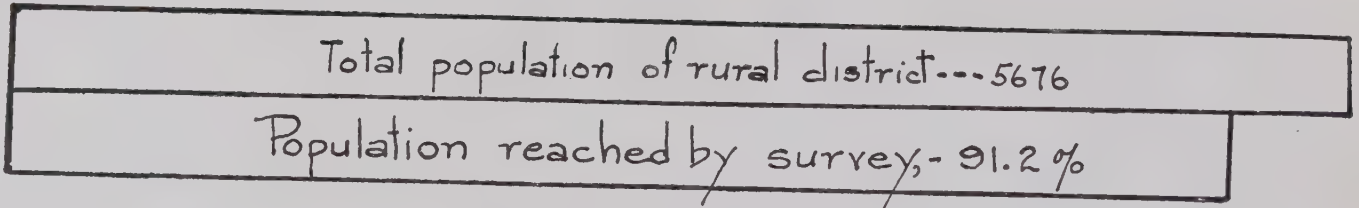
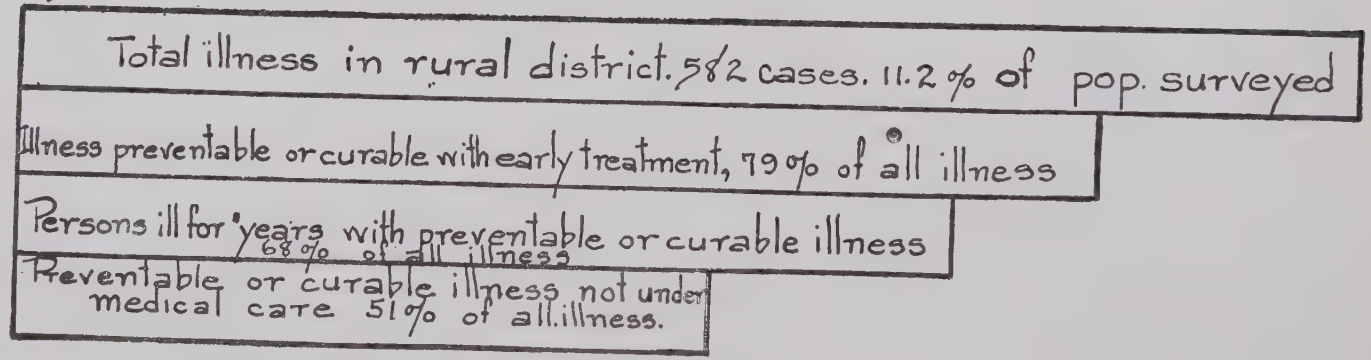


Figure II


Total illness in rural district. 582 cases. 11.2% of pop. surveyed
Illness preventable or curable with early treatment, 79% of all illness
Persons ill for years with preventable or curable illness 68% of all illness
Preventable or curable illness not under medical care 51% of all illness.

Investigation of Sickness in Albany County
by the
State Department of Health.

Fig. 202.

It may occur to some readers that the spleen should be removed when it gets in the way. In ague cake, in leukemia, and in a few other conditions the great, heavy organ is as much in the way in the abdomen as any large abdominal tumor would be. Surgeons remove these other tumors, why not the heavy spleens?

The answer is this: Usually the spleen is large because it has extra work to do. If the number of germs to be removed is small it can be done by the liver or some other organ, in which event the spleen could be removed without harm. But when the spleen is big because it has big work to do, it would be most unwise to remove it. Therefore, the surgeons do not remove ague cakes or leukemic spleens

CHAPTER XXXIII

Heart Disease

In this country school inspectors are not allowed to remove the clothing in examining school children. Therefore in order to learn how much heart disease there is among school children and what effect such disease has on their health it is necessary to go to reports from the old country.

The *Medical Officer* for May, 1911, has an interesting study of heart disease among school children of a small town in Scotland. Of 2,380 children examined, 131 had leaking heart valves and 55 had nervous hearts. Those having organic heart disease—leaking valves—on an average were 55 per cent below height, 52 per cent below average weight, and increased in weight at a rate which was 60 per cent below the average.

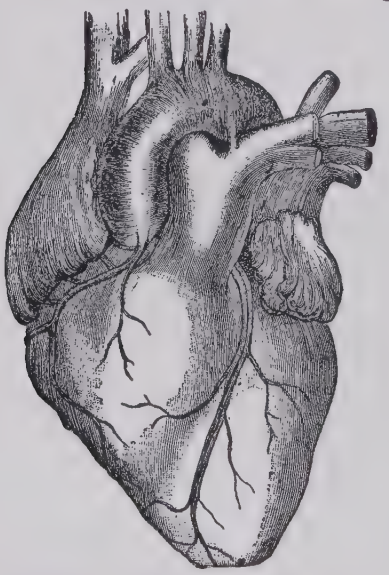


FIG. 203.—HEART AND THE GREAT VESSELS WHICH LEAD INTO AND OUT FROM THE HEART. CORONARY ARTERIES WHICH SUPPLY THE HEAD MUSCLES WITH BLOOD. The left ventricle makes up the apex. The right ventricle is not so prominent.

A crippled heart valve causing a leak, ordinarily called heart disease, results from bacterial destruction. Rheumatism is that bacterial disease which is the usual cause of heart disease, though in scarlet fever, pneumonia, diphtheria, and even in hard colds, the needed germs can enter the blood and become attached to the valves.

If there were no heart disease rheumatism would not amount to much. If there were no rheumatism, life insurance would be 10 per cent cheaper, for heart disease would not amount to much.

Engineers know it to be good economy to put in a 1,000 horse power boiler for a 500 horse power plant. They learned that by experience. Had they asked what the human heart had to say about it they would have had an answer. The human heart does its work with three-quarters of its horse power held in reserve. When rheumatism has crippled a valve the heart compensates by using a little of the reserve horse power.

Ordinarily we say a man has heart disease when his compensation fails. It would be truer to say he has a failing heart compensation, the result of heart disease. The real heart disease was in existence when during rheumatism his joints creaked and, over the heart a soft, blowing mur-

mur was heard. When his acute disease subsided his rheumatic joint was a little stiff and his heart valve leaked. In a certain sense he had heart disease at that stage, though he would have resented being told so, for he felt equal to anything. Twenty—perhaps forty—years later his heart muscle lost some of its tone, compensation failed and he finds out a fact that had been a fact since his childhood—he has heart disease.

THROBBING AND BEATING

As the heart beats the force of the contraction runs instantly down the arteries and loses itself in the capillaries. The blood runs in the same direction but it runs slowly as compared with the force that we call the pulse. We see the same thing where a pump is sending water through an iron tube. When we watch the end of the pipe we notice that at the instant the piston strikes, the water spurts. The water took several minutes to flow from the pump to the nozzle but the spurt arrived in a fraction of a second.

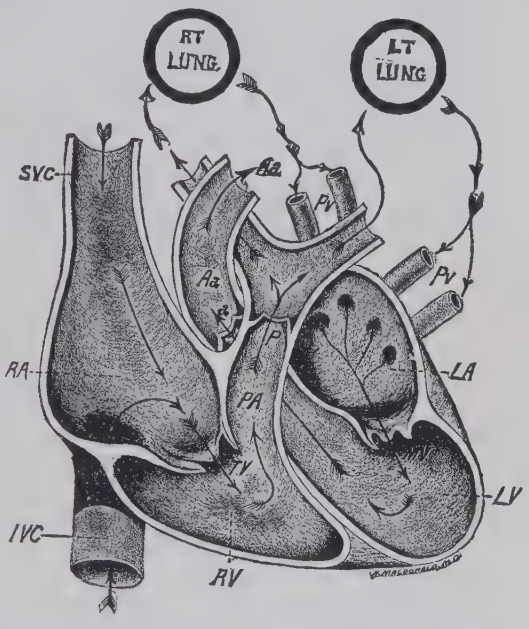


Fig. 204.—Diagrammatic Section of Heart Showing Cavities and Vessels. LV, Left Ventricle; LA, Left Auricle; PV, Pulmonary Veins; MV, Mitral Valves; a, Aortic Valves; Aa, Aorta; RV, Right Ventricle; RA, Right Auricle; SVC, Superior Vena Cava (vein carrying blood from head, neck and arms). IVC, Inferior Vena Cava (vein carrying blood from trunk and legs); TV, Tricuspid Valves; Pa, Pulmonary Arteries.

In the case of an iron pipe the throb is just as plain a few hundred feet away as it is at the pump. In the pulse the throb disappears in the capillaries—in no case more than six feet from the pump, the heart. The water in the iron pipe had a wall in which there was no give and in consequence all the forces of the piston carried on the water stream.

In the arteries the blood vessels have walls nearly as elastic as rubber. Some part of the force of the heart is used in stretching the vessel. After a flow of a few feet the blood moves smoothly and evenly and without any jerks or spurts. The blood in the capillaries and veins flows smoothly and evenly—there is no pulse. That is the way when things are right.

In old people the arterial walls are stiffened. Some of the rubber is gone. Their vessels are more like iron pipe in that they have not much give. The larger blood vessels are generally placed so that they can swell without pressing on anything. The smaller blood vessels are not infrequently

packed in tighter. In an old person the stiff arteries continue the pulse impulse into some of these smaller vessels. Here the pulsing presses on delicate nerves.

Old people not infrequently complain of thumping in the ears and disagreeable pulse beats elsewhere throughout the body. It causes nothing more than annoyance and is not worthy of the worry that it usually occasions.

When a limb is swollen and sore the pain sometimes comes in throbs. The pulse beats can be felt and they hurt. The tissues are filled with an excess of fluid, the skin is stretched tight; as the pulse beats the small nerves cannot roll out of the way—they get pinched and pain results. Again, the inflammation throws the muscles of the small vessels out of service, the vessels dilate their walls and cannot give further. They are somewhat similar in physics to the iron wall pipe, and the pulse beat, instead of stopping where it should, is carried on into the smallest blood vessels.

If a man has a sore foot and would be rid of the throbbing he can usually succeed by raising it. If the foot vessels can be rid of gravity they come near enough handling the situation to stop the throbbing.

In no part of the body is throbbing so much in evidence as in the teeth. Nowhere else do blood vessels and nerves pass through such narrow quarters, such cañons between solid, bony walls.

Throbbing pains are then the result of mechanical conditions. Some of these can be changed and the condition remedied, some must be endured.

THE HEART AND EXERCISE

Should a man be afraid to exercise because of his heart? How should a well man decide this question? How should a man with a nervous heart decide it? How should a man with disabled heart valves decide it?

To some it would seem silly to ask whether well men can harm their hearts. Yet a good deal has been written about acute dilatation of the heart and some office men with very soft muscles are afraid to exercise.

Occasionally there is a report of the results of close, careful examination of a group of athletes who have just finished a marathon or similar contest which states that dilatation of the heart has been the rule.

As to persons with sick hearts the Schotts of Nauheim and those of their school have written forcibly and often of the great danger of dilatation of sick hearts from what they hold to be overexercise.

The heart is a bag. Or, rather, it is two bags, for there is one bag, the right, to get blood to the lungs, and another, the left, to get it to the rest of the body. The wall of this bag is elastic. It is composed of muscle which expands and contracts alternately.

The blood returning from the veins pours into this bag. This blood is under pressure. It balloons the bag. The muscle of the wall responds by contracting. It collapses the bag driving all of the blood into the arteries. There is, therefore, a constant opposition between the ballooning force of the blood in the heart and the collapsing force of the heart muscle.

In the period extending from heartbeat to heartbeat there is a time in which the inflowing blood is ballooning the heart and another time in which

the muscle is collapsing the bag. In this antagonism of forces things are going well if the muscle force is easily holding its superiority over the ballooning force. Other things being equal the good heart is the one which does not balloon out and dilate unduly.

Dr. Williamson, assisted by Drs. Hartung, Moore and Mosser, has attempted an answer to the questions asked above by accurately measuring with x-ray apparatus the hearts of a large number of persons. Some were healthy young men with sound hearts. Some had heart disease, but compensation was fully established. Some had no heart diseases but were afflicted with other diseases the nature of which would lessen the tone of the heart muscle. Others had heart disease with a failure of compensation.

The hearts of these persons were measured. They then climbed stairs until their pulsebeat was around 160 and the beating was rapid and "panty."

The hearts of the well people were less ballooned after this violent exercise than before. The answer for that group is that exercise is good for the heart immediately and ultimately.

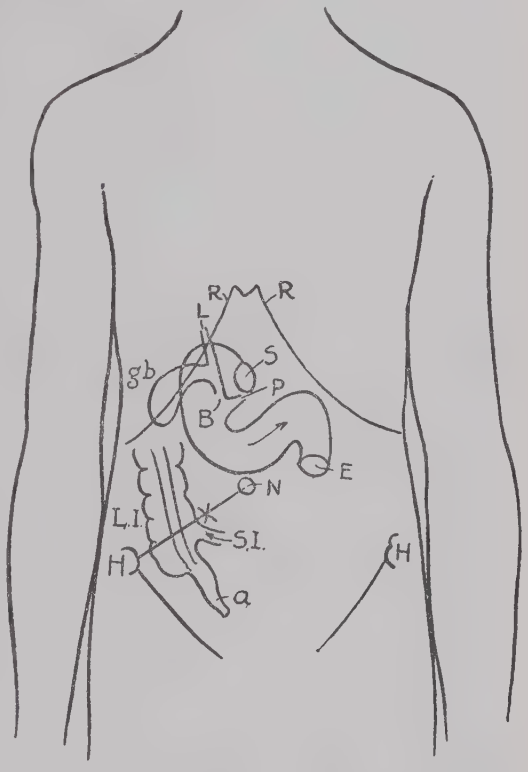


Fig. 205.—Sketch Showing Approximate Location of Gall Bladder (gb), Appendix (a), Navel (N), Crest of Ilium—hip bone—(H), and Rib Border (R).

In the case of the sick persons with good compensation one-half of the hearts ballooned less than before the exercise. In the case of the sick persons with poor compensation nearly one-half ballooned less after as compared with before the exercise. This violent exercise was of momentary benefit even in heart cases.

The answer then to the last question is that persons with sick hearts under proper direction can exercise with immediate benefit and also with ultimate good. Finally, people with nervous hearts need exercise above all else.

Valvular Trouble Symptoms.—*E. K. A. writes: "What is a leaking heart valve? How does it affect a person? Does it cause the nose to bleed? What are the symptoms?"*

Reply.—A heart valve is like a pump valve. When the blood is going in the right direction it gets out of the way. When the blood starts in the wrong direction the valve gets in the way, closes the opening, and stops

the backward flow. If the valve is shriveled as the result of disease or is not large enough to stop the backward flow, it leaks.

If the heart muscle works hard enough to repump the leakage there are no symptoms. A physician listening to the heart will detect a blowing sound which he knows means a leaking valve.

When the heart muscle has lost some of its power and can no longer repump the leakage then symptoms appear.

The more frequent symptoms are swelling of the feet, short breath and palpitation. There may be nosebleed.

Care with Heart Murmur.—*J. W. writes: "A gentleman friend of mine, 26 years old, is troubled with a soreness in the left side which has been described by a physician as a 'heart murmur.' He has been in the habit of taking a cool bath every morning and evening. Don't you think this too often, and that the shock to the heart is too great? Wouldn't just the evening bath be sufficient?"*

REPLY.—A man with a heart murmur must be extra careful to keep up his general muscle tone. If he gets a good reaction after a cold bath his muscle tone will be benefited. If not he will be harmed. If he can take one he can take two.

See Heart Specialist.—*"Thankful" writes: "Would you kindly tell me if there is any hope in leakage of the heart for a man of 46? He is a tailor. Once in a while he has to lift about 300 pounds of goods. Does smoking hurt him? Would you suggest something for him?"*

REPLY.—If you have an injured valve and that is the reason of the leak you cannot hope to restore the valve to what it was. But you can hope to live reasonably comfortably and be able to work for many years, possibly for as many years as is the lot of the average man of 46.

To do this you must so regulate your life as to keep your muscles in good tone and you must always be careful not to overstrain your heart.

In lifting 300 pounds of goods, divide it into "takes" that do not make you pant.

You should stop smoking.

Ask your physician to go with you to a heart specialist. Have them together lay out a plan for you—how much work, what kind of work, how much exercise, what kind of exercise and similar advice in detail. Then follow directions.

Nervous Heart.—*J. C. W. writes: "1. What is a nervous heart? 2. What are the symptoms? 3. What are the causes of nervous heart? 4. How may the condition called 'nervous heart' be corrected or cured? 5. What are the consequences of neglecting it?"*

REPLY.—1. A heart that is easily made to beat too fast, or too slowly, or irregularly in speed, or too hard, or too feebly, or irregularly in force, or to skip.

2. Variation in speed, or force, or rhythm without adequate cause; rapid, irregular pulse, pounding heart beat, or skipping pulse are symptoms.

3. Tobacco, excesses of various kinds, general nervousness.

4. Remove the cause—e. g., stop tobacco. Practice simple, plain, hygienic, sane living through nervous poise.

5. A nervous heart may and does frequently nourish itself poorly and

in consequence the heart muscle loses power. Irregular heart action may contribute to angina pectoris. Generally speaking, a nervous heart is not so serious a matter as the affected person thinks.

Nervous Heart Evidence.—*J. W. writes: "Please give the symptoms of a nervous heart and the best remedy for it. Is it dangerous?"*

REPLY.—A nervous heart is one that under any form of excitement or under the strain of physical exertion beats very rapidly or irregularly. We expect the heart to beat faster when one exerts himself but if the increase is much greater than that of the average person the heart is nervous.

The way to find out is to feel the pulse.

The most frequent form of nervous heart is the tobacco heart. That is seldom dangerous, but is annoying.

The remedy is to stop the use of whatever is causing the nervous heart if it is some drug like tobacco or coffee.

The heart is frequently nervous when the thyroid gland is enlarged or overactive. Finally, remember that watching the pulse can cause it to beat fast and sometimes can cause it to become irregular.

Nervous Heart Not Serious.—*K. G. N. writes: "If consistent will you kindly advise me as soon as possible whether or not a 'nervous heart' is a serious condition; or will lead to serious conditions if neglected?"*

REPLY.—A person with a nervous heart usually thinks it more serious than it is. Nothing is more alarming to a man than to feel his heart cutting up. Upon regular beating of the heart depends not only general nutrition but the nutrition of the heart muscle itself. Therefore a nervous heart in time results in some organic trouble—in the main, flabby heart muscle. If the nervous heart results from tobacco habit or any other removable cause, no man is justified in not removing it.

Heart Trouble.—*A. B. B. writes: "Would you advise a heart stimulant in the case of a woman 38 years of age, married and the mother of two children almost grown? She is seldom sick, and never complains, but her heart bothers her. It beats hard, often missing a beat, and her pulse beats often 100 and seldom less than 85. She is not a big eater, but her heart is always worse after meals. I have had her examined by several doctors, who say she has no leakage."*

REPLY.—Do not give her a heart stimulant. Her heart is now overstimulated. Evidently her heart is nervous from some cause located elsewhere in her body. It may be that her thyroid is secreting too freely. It may be her stomach is the seat of trouble. It may be purely mental. Of itself the condition is of little consequence. If it is the result of too much thyroid, that should be looked after. If of the stomach trouble that should be looked after.

Heart and Altitude.—*Constant Reader writes: "What effect does the high altitude of the West have on one who has heart trouble? Would it be safe and beneficial for one 35 years of age who has heart trouble, is under weight, and whose general health needs building up to live at an altitude of 4,000 feet or so in New Mexico or Colorado? Which would be better, the mountainous regions of the South or the southern part of New Mexico for one in such condition?"*

Reply.—1. Generally speaking, an altitude of 4,000 feet has no effect on the heart. There are some exceptions. 2. Whichever makes you happier.

Find Cause.—*A. H. F. writes: "Will you kindly state what is meant by a tremor of the heart? Can anything be done to cure it?"*

Reply.—I judge that by tremor you mean that you have palpitation of the heart at times. If so, you should find the cause and correct it if you can. It may indicate a condition of great gravity, and it may mean some-

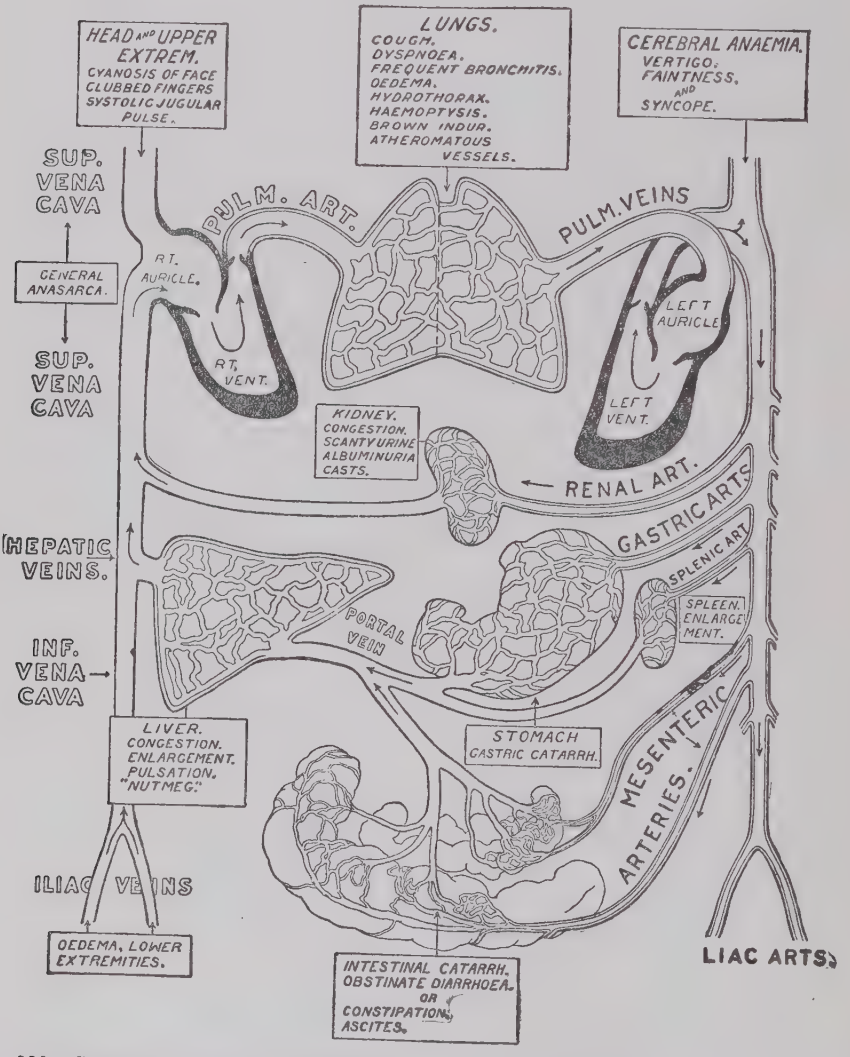


Fig. 206.—Scheme Showing Circulation of the Blood. Systemic circulation: arteries shown on the right, veins on the left. Pulmonary circulation arteries shown on left, veins on the right. In brackets are stated the effects of certain disturbances of circulation. Examples: Obstruction of return of blood from legs results in edema of lower extremities (lower left bracket). Obstruction to return of blood through innominate vein results in cyanosis of face, clubbed fingers, pulse in jugular veins (upper left bracket). Insufficient force in carotid artery results in vertigo, faintness, syncope (upper right bracket).

thing that can be easily remedied. It may be caused by smoking, overeating, indigestion, constipation, high arterial pressure, lime plates in the arteries, a weakening heart muscle, a diseased valve, etc. You will note that most of these causes can be remedied.

Chronic Myocarditis.—*F. J. writes: "Will you describe the symptoms of chronic myocarditis, cure if any, and effect of hard work on one suffering from it? Advise what precaution to take, and if a complete rest from mental or physical strain will help."*

Reply.—In chronic myocarditis there may be very few symptoms. A weak, rapid pulse, a weak apex sound and a low blood pressure are fairly good signs. But do not put thought on the diagnosis. A diagnosis requires good diagnostic ability. Have an examination by a capable diagnostician and accept his opinion. One with chronic myocarditis should devote his care and control to efforts to make his disabled organ equal to the tasks imposed. Temperance in work and worry, in eating and drinking is the proper plan.

Nothing Out of the Way.—*B. F. M. writes: "I hear sounds with heartbeats, though not constantly. I have consulted physicians with no results. I am perfectly well at 65. The sound is sometimes a whir, a chug, or a peep, and more troublesome at night."*

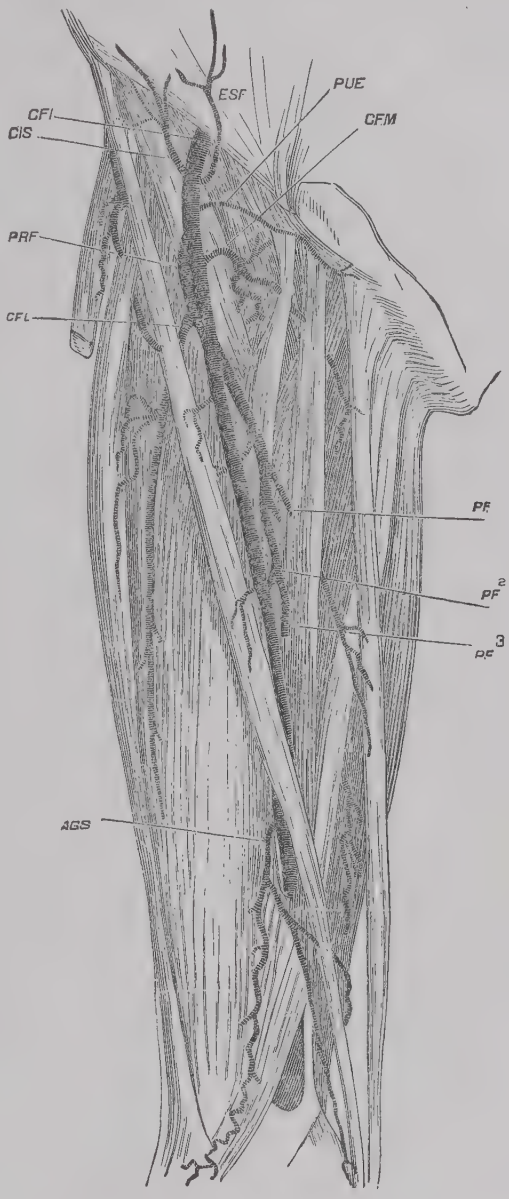
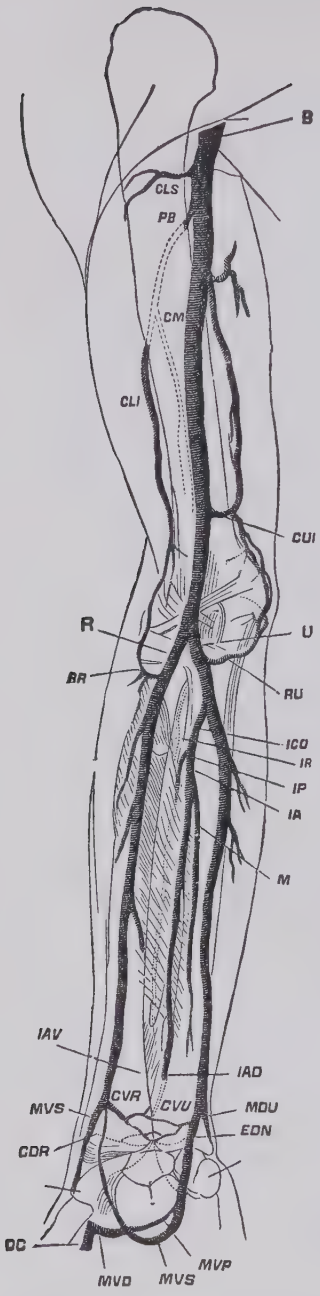


Fig. 207.—Femoral Artery and Its Branches. CFI, common femoral; ESF, superficial epigastric; CIS, superficial circumflex iliac; PUE, external pudic; PRF, deep femoral; CFL, external circumflex of thigh; PF^1, first perforating a. of the thigh; PF^2, second perforating a.; PF^3, third perforating a.; AGS, arteria anastomotica magna; SF, superficial femoral.



REPLY.—In certain positions it is easy enough for one to hear his heartbeats. To him they may sound like a whir or a chug or a peep according to how he happens to hear them. A heart murmur loud enough for you to hear could not escape an examining physician. You can therefore feel certain that what you heard were the normal heart sounds.

Have Your Heart Examined.—*A. C. writes: "In a man of 73, in apparent good health, whose normal pulse had been 60 per minute, what causes it to drop to 50 and 55, with sometimes an intermittent pulse?"*

REPLY.—It may not be of any significance. It may mean some lime plates in the arteries. You had better have your heart examined and your blood pressure taken.

Irregular Beat of Heart.—*D. A. writes: "1. I was examined recently by a physician who told me I was in good condition. He said my heart had a catch in it, but he did not consider this of any consequence. Would you consider this a disease of the heart? If so, can it be cured or remedied? 2. Will tobacco contribute to this if the smoke is not inhaled? 3. Could indigestion cause this irregularity of the heart?"*

REPLY.—1. I suppose by "catch" you mean your heart interrupts or skips a beat occasionally. Skipping a beat may result from disease in the heart. It usually results from causes outside the heart. It can usually be cured. 2. Yes. 3. Yes; a man with a heart that skips should find out what he is doing wrongly (e. g., worrying, smoking, or digesting poorly) and change it.

Has Years to Live.—*E. L. writes: "What are the possibilities of living for a man of 40 with a mitral lesion? Is it possible for a man so afflicted to live to 60 or 70? Does such a condition have any marked symptoms, such as swelling of limbs, nosebleed, or fainting spells?"*

FIG. 210.—BRACHIAL ARTERY (arm) AND ITS BRANCHES. B, brachial; R, radial; U, ulnar; CLS, arteria deltoidea; CLI, profunda radial; PB, superior profunda; CM, arteria collateralia media; CUI, anastomotic a. of arm; RR, anterior radial recurrent; RV, anterior ulnar recurrent; ICO, common interosseous; IA, anterior interosseous; IP, posterior interosseous; IR, posterior interosseous recurrent; IAV, arteria interossea anterior volaris; IAD, arteria interossea anterior dorsalis; M, median; CVR, anterior radiocarpal; CVU, anterior ulnocarpal; CDR, posterior radiocarpal; MDU, posterior ulnocarpal; MVS, superficial volar; MVP, ulnar portion of deep palmar arch; DC, first palmar digital.

REPLY.—1. If he is wise, has good muscles and has a good compensation he is nearly as likely to reach 70 as the average person of 40.

2. When there is a break in compensation these symptoms appear. A break in compensation means that the heart muscle is straining to do the extra work and not succeeding well. To avoid this keep fit, especially keep your muscle tone good, live hygienically and do not overdo.

Heart Trouble.—*B. L. R. writes: "I am engaged to a young lady who has heart trouble and has had several attacks of inflammatory rheumatism during the last ten years, the last being three years ago. Her physical development is perfect, height about 5 feet 6 inches and weight about 140.*

"I am over 6 feet tall, weigh 180, have never been sick, and free from anything of a contagious nature. My fiancée feels well, although she has shortness of breath on going upstairs rapidly. Do you think it safe for us to marry? I know she is not able to do much work, but I am in position to let her have all of the help she needs. I also realize that she will need better care than many men give their wives."

REPLY.—Her heart disease is evidently the result of rheumatism; her rheumatism the result of a bacterial infection. She did not inherit either nor can she transmit either. The question, then, is limited to how long her heart will be able to do the extra work which its leaking valves throw on it. If you are in a position to make her married life easier than her single life has been her compensation will be maintained longer married than single; otherwise not. Judgment as to permanence of her heart compensation must be based on (a) amount of damage to the heart valve, (b) state of heart muscle tone, (c) state of general muscle tone, (d) whether or not rheumatism germs are continuing to find entrance to the blood, joints, and heart. The opinion of those who have seen her, examined her, and know her is much better than mine or that of any other stranger.

Probably Angina Pectoris.—*M. A. L. writes: "What is the cause of pain in the chest, beginning at the breast bone and passing into the collar bones and shoulders? The pain seems to be in the bones rather than inside the chest walls, and is intense for a few minutes, then passes away."*

REPLY.—My guess is that this is angina pectoris. The pain of the condition does not start in the breast bone. It starts behind the bone and shoots into the arm. See your physician about it.

Don't Try "Remedy."—*B. F. M. writes: "For the last few years I have had a leaky valve which I acquired through rheumatism. It is in the artery going out of the heart to the body (the aorta).*

"According to an article recently printed, it is claimed that a treatment of hammering on the seventh cervical vertebra will contract the aorta.

"Will such treatment by a physician do any good to the leaky valve, as it is claimed it will contract the artery?"

REPLY.—It will do absolutely no good. The aorta is made up of dense fibrous tissue like gristle and some elastic tissue like rubber. It contains no muscle. It cannot contract and dilate as do small arteries. It cannot be stimulated to contract. Its limited power to change size is similar to that of a rubber tube. Therefore pounding on a vertebra is foolishness. When people study and know more about such things it will no longer be possible to make foolish claims for treatments and get away with it. A

leaking aorta can be made to do satisfactory work if the heart muscles are kept strong enough to do the extra work thrown on them by the leak. In building up the general muscles the heart muscle will be built up.

Heart Trouble in Son.—*J. S. C. writes: "What can I do that will be best for my son? He is 16 years old and has a touch of heart trouble. He has had it for five years and it is now worse and more dreaded by him than ever. He weighs 95 pounds and is 5 feet 1 inch in height."*

REPLY.—The first thing for him to do is to quit dreading it. Dread will make it twice as bad. It should be no trouble for a 16 year old boy to keep his heart equal to its work. A fair percentage of 10 year old boys have heart leaks but the heart muscle is so strong during those years that no symptoms result. The symptoms come when the adults begin to let their muscles get flabby. Your boy should be watched over by a good physician. Under his direction the boy should exercise enough to build up his muscles. As he gets stronger he should exercise more. His heart muscle will get strong as his other muscles get strong. Let him forget his heart and watch his calf, his thigh and his biceps.

Quick Heart.—*W. A. D. writes: "The insurance examiners say I have a nervous heart. It beats 80 standing, 64 lying down, and 96 after walking upstairs, and misses a beat now and then. I am 43, general health good, sleep and eat well, and am gaining flesh, although weight is somewhat below normal—145 pounds, 5 feet 8 inches tall. I work hard mentally and get tired easily. Can a man over 40 do more than conserve his nervous energy? How can he increase it?"*

REPLY.—A heart which is sixteen beats faster when standing than when lying down, which increases another sixteen on walking upstairs, and which skips a beat occasionally may or may not be structurally sound. Have your physician find out if the valves are sound and the muscle not degenerated. If everything is organically all right cut out tobacco and all other bad habits, take some muscle exercise and get yourself in hand.

Doctor Should Superintend.—*B. T. W. writes: "I am a man 53 years old. I weigh 180 pounds, am 5 feet 10 inches in height. I was recently examined for life insurance and was refused, I have since learned, on the following account: 'High blood pressure and slight murmuring of the heart.' Can you suggest what exercise and diet to follow to remedy these defects as much as possible?"*

REPLY.—If your blood pressure and heart condition was bad enough to cause your rejection by the life insurance company you had better have your physician superintend your efforts. The general principle of such efforts should be as follows:

A—When a heart valve leaks the heart muscle is called upon to do extra work. If the heart muscle is in good tone it does the extra work and there are no symptoms from the leaky valve. If the muscle tone is lost we say compensation is broken and we expect symptoms to ensue. The plan of treatment then is to build up muscle tone. This is done by carefully graduated general muscle exercise. To be right the exercise must almost reach the point of making the heart beat fast and hard but must not quite do so. You must work almost to the point of tire but not quite. You must persist.

B—When the blood pressure gets high the elastic tissue of the blood vessel walls has been worn out and been replaced by inelastic tissue. It is therefore late to begin. The best you can do is to eat fruit enough to keep your bowels regular and to live abstemiously. No tobacco, no alcohol, no heavy meals; in fact, light meals consisting largely of cheese, milk, buttermilk, bread and fruit are advised.

Have Heart Examined.—*A. B. C. writes: "I am a man 35 years of age, and up to six months ago drank almost every day regularly. I stopped drinking suddenly; just made up my mind to stop for ever, and did. Shortly after doing so I would become nervous at the least provocation and my digestion has been bad off and on of late. Almost constantly for the last few months my heart has bothered me greatly by its thumping at night, when I lie down in bed to sleep. Sometimes it thumps so fast that I imagine it will jump out of my mouth, and then it will get so slow that I am in dread it will stop. Most of the time my pulse is 60 to 66, when calm, and under any excitement it jumps away up to 100. I sometimes get so dizzy that I imagine I am going to drop dead. I wish you would tell me what you think is the matter and advise me what to do, as I am becoming a wreck worrying about myself. Is a pulse of, say, below 72 a sign of a weak heart or a bad one? Is 60 to 66 too slow for me? The beat is a light one, but seems regular."*

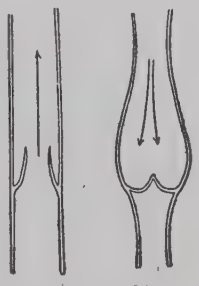


FIG. 209. — VEINS, SHOWING (A) VALVES OPEN WHEN BLOOD IS FLOWING; (B) CLOSED WHEN BLOOD STARTS TO FLOW IN WRONG DIRECTION.

REPLY.—The condition described is much more suggestive of tobacco poisoning than of alcohol poisoning, and you do not tell your tobacco habits. A pulse beat below 72 is not a sign of a weak heart or a bad one. Have a physician examine you to find out if you have a heart leak. If you have not but have a nervous heart instead he will tell you how to end that. He will start by telling you to quit worrying, to quit watching your heart and counting your pulse.

Blood Pressure in Hardening of Arteries.—*C. G. R. writes: "Can there be high blood pressure without hardening of the arteries? What is the average blood pressure? What would blood pressure of 150 indicate?"*

REPLY.—1. The pressure rises temporarily from many causes. If it persistently remains high it means hardened arteries.

2. Varies with age. In childhood, under 100; in early adult life, 120 to 130; after 50, 150 to 160.

3. Hardening of the arteries in anyone under 50.

Prevention of Hardening of Arteries.—*M. writes: "What is the treatment proposed by a Russian scientist to prevent premature arterial hardening? What can be done to reduce blood pressure?"*

REPLY.—1. The Metchnikoff plan is to prevent the growth of putrefactive bacteria in the large intestine by infecting the contents thereof with an acid secreting bacillus. He makes use of a certain lactic bacillus which makes a great deal of acid and is not killed thereby. This bacillus can stand acid four times as strong as ordinary lactic bacilli. To help out, this bacillus should be given with much sugar. The treatment is not getting a fair trial, since many of the commercial preparations are composed of germs easily killed by acid.

2. Not much can be done. The horse is out; what good to lock the stable door? Eat lightly, live temperately, and avoid constipation.

Tissue Change in Hardening of Arteries.—*C. J. D. writes: "What causes hardening of the arteries? Is it curable? By what general methods, baths, or medicine? How is this trouble prevented?"*

REPLY.—*The tissues of young people are exceedingly elastic. The more elastic fibers of the tissues wear out more rapidly than other tissues. As they wear they are replaced by a harder, less elastic tissue, called fibrous tissue. It happens that the change from elastic to fibrous tissue in the arteries can be measured in a rough way by measuring the blood pressure. There is no satisfactory way to measure senility in the other tissues.*

When a man's blood pressure indicates that his arteries are old as measured by wear his other tissues are also worn, though it cannot be proved.

The papers tell us of cures by radium. Maybe so, but I doubt it. To change one's method of living is more rational. While cures have a small field the field of prevention is large.

The method? Right living; temperance in eating, drinking, working, worrying; avoiding infections and subinfections, especially avoiding rheumatism and gout.

Cause of Hardening of Arteries.—*W. H. S. writes: "1. What causes hardening of arteries and high blood pressure in a middle-aged man? 2. What can be done for a person who is said to be neurasthenic?"*

REPLY.—1. Overeating, drinking stimulants, constipation, a tobacco heart, Bright's disease. There are other causes but these five are the most important.

2. Exercise in the open air, a natural life, taking an interest in others, optimism. Many mild cases cure themselves by reading books on nerves. In these they learn that "there are others," that their experiences are no worse than thousands of others have had, that the condition in the main is due to bad mental inheritance or bad mental training or both, and that it yields to patient efforts at nerve control.

Water in Hardening of Arteries.—*A. F. writes: "I am a woman, nearing 60. Have hardening of arteries, and b. p. much above normal. What effect would hard water (very hard) have upon me, in my condition? Would boiling the water, and pouring off for use after the white deposit settles, make it less injurious?"*

REPLY.—Hard water will not harm you. Boiling it will make no difference so far as your arteries are concerned. Back of the existing condition in your arteries lies the cause. You used up the strength and elasticity of your arterial walls when you were young. As long as Nature could she repaired the wear with the best materials, elastic and fibrous tissues.

Now she must stop it with the best available material and this is lowly organized tissue and lime salts.

The lime salts are not to blame. In fact, were they not available the wall would give worse than it does.

An excess of salts taken in as hard water is passed right out by the kidneys and bowels. The mineral may hurt these organs a little but it will not harm the arterial walls or the tissues generally.

Premature Hardening of the Arteries.—*J. W. writes: "1. In the case of an individual about 40 suffering from premature hardening of the arteries, not in any marked degree, but where the hardening is perhaps ten years in advance of his years, can it be arrested? 2. Would or does this condition necessarily lead to or cause bodily discomfort, disability to perform manual labor, illness, or shortening of life? 3. Are fat, well nourished people usually those whose arteries are in prime condition? 4. What is considered the normal blood pressure?"*

Reply.—1. Yes, by eating in moderation, living temperately and hygienically.

2. No, as to all except the last and even that can be avoided.

3. No. Fat people usually have pressure a little higher than normal.

4. 110 to 140, but what is normal at one age is high at another. It is lowest in infancy, rapidly heightens during childhood and adolescence, then slowly until 70 to 80, after which it may be somewhat lower. The force of the heart beat is a contributory factor and that goes off a little in old age.

Simple Life Only Avails.—*Southerner writes: "Will you please tell me what causes arteriosclerosis and what, in your opinion, is a sensible treatment? My husband has been told by a physician that he is suffering from it. He complains of nothing, save of a tingling in the tips of the fingers of his left hand, and all the left arm is almost continually in the condition popularly described as 'asleep.' What would you advise and also what is the span of life after a case of arteriosclerosis reaches the condition of being well defined? My husband is 52 years of age, weighs 180, and is intensely nervous. I have been much given over to the idea of calomel, and you have turned me from this faith."*

Reply.—1. Arteriosclerosis is due to the wear and tear of life. The processes of senility begin in a baby at birth. The child ages most rapidly. Senility progresses much more slowly in middle life but its effects are more generally recognized. At no other period does one age so slowly as in old age.

The process is one of wear. Wear is greatest when the wheels are turning fastest. Worry, whisky, and improper eating increase the wear. The other tissues wear as do the artery walls, but in the artery walls scar tissue grows to take the place of the worn muscle.

A way to measure the vessel wall change mathematically has been found. That is why we hear so much about high blood pressure and arteriosclerosis.

Arteriosclerosis having been diagnosed, follow the simple life. Nothing else avails. Of course, the time to have locked the stable was before the horse escaped.

2. People who live in a warm climate and eat heavily have swollen livers. Calomel purges them and makes them more comfortable. So would any other purge. But why go on swelling one's liver and purging to get it down again? Is there sense in that?

Treatment of Hardening of the Arteries.—*C. T. C. writes: "1. Is olive oil beneficial in cases of hardening of the arteries? 2. Will massage relieve pain in such cases? 3. Is there any remedy for enlarged liver? 4. What will prevent accumulation of gas in the stomach?"*

REPLY.—1. No.

2. Massage will help many kinds of pain.

3. Depends on what causes the enlargement. The enlargement of the liver which comes in summer can be cured by eating less.

4. Gas is not formed in the stomach in any considerable amount. Much gas is swallowed. Slower eating limits this. Belching, if that is what you mean, nine times out of ten is a sign of nervousness and is to be so treated.

Symptoms of Hardening of Arteries.—*Florida writes: "Please state what some of the symptoms are of hardening of the arteries."*

REPLY.—High blood pressure, large quantity of urine, enlarged heart, dizziness, vertigo.

CHAPTER XXXIV

Blood Pressure

BLOOD PRESSURE RECORDS

We begin to get old when we begin to live. When we are young we get old rapidly. When we are old we get old slowly. The tissues of a baby age rapidly. The tissues of a man of seventy age slowly. A baby is a great energy waster. He has a surplus of energy and he spends it like a drunken sailor. An old man makes his efforts count.

Repair never leaves the cell quite as it was before the waste. Some vitality is gone even when everything seems absolutely normal. After a few decades the difference between the cells as they are and as they were at the beginning becomes recognizable by certain tests. The only test that is reducible to a mathematical basis is blood pressure.

Blood pressure is a test of two tissues only—the blood vessel wall and the heart muscle. Therefore, it is only a partial test but at that it is a better test than the years lived.

The insurance companies pay out most of their money for wear and tear diseases. The most promising way of lessening the wear and tear diseases is by changing some of the popular customs. To this end the life insurance companies spend money on efforts for public education.

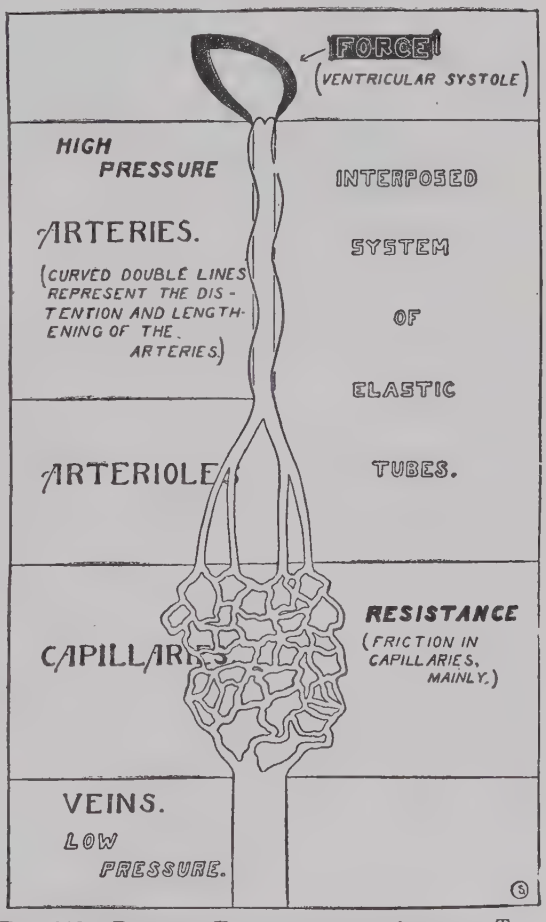


FIG. 210.—DIAGRAM EXPLANATORY OF ARTERIAL TENSION.

The Northwestern Life has been studying blood pressure. It has observations on about 3,000 people, some of whom had been insured five years. The average blood pressure of those who passed was 143. The 525 with highest blood pressure among those passed had an average of 153. Seven hundred and twenty-three persons rejected had an average pressure of 171.

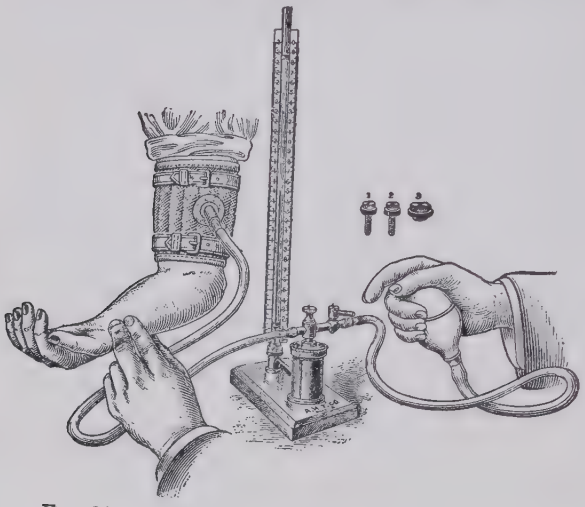


FIG. 211.—METHOD OF TAKING BLOOD PRESSURE.

In another group of cases the average blood pressure of those under 40 accepted was 125. The average of accepted risks at 40 to 44 had an average pressure of 128; 45 to 49, 130; 50 to 54, 132; 55 to 60, 134.

When a life insurance company insures a man it counts upon his living out a certain expectancy. The actual death rate among a group of insured who had a blood pressure of 143 was but 47 per cent of the expected death rate. In the group with a pressure of 150 and over, the death rate was 70 per cent of the expectancy. Of those rejected and having a pressure of 171, the death rate was 153 per cent of the expectancy. Those having a high pressure, 171, and some organic disease had a rate of 161 per cent of the expectancy.

The causes of death in the high blood pressure cases were apoplexy, 13; *Bright's disease,* 10; *heart disease,* 8; *arteriosclerosis,* 6; *remainder, scattering. In the cases in which the blood pressure averaged* 152, *apoplexy and heart disease led but the lead was not so great.*

PROTECTING THE BLOOD

The blood runs from the heart through the arteries to the capillaries and then back through the veins to the heart. The blood is always inside a closed tube. When the structure of man was planned it was seen at once that the important fluid—the blood—must be protected against infection. On the other hand, it was seen to be necessary, in order that the tissues be nourished, that the liquids ooze out of the vessels so that the cells of the body might soak in them. Therefore the small blood stream was so arranged that food could easily soak out but that harmful things could not soak in.

Now, whenever any arrangement for soaking out is provided an arrangement for soaking in must also be provided; else presently everything will be out and nothing will be in.

The arrangement provided was that whatever had got out could get back in again by flowing into certain spaces and then flowing along certain tubes and through certain filters and finally back into the blood stream.

This especial arrangement for getting the tissue juices back into the blood stream is known as the lymphatic system. It is an adjunct to the blood system especially provided to make it safe for the blood fluids to do their work.

A properly arranged lymphatic system must have open mouths. It must be easy for anything to get in. Therefore the lymph vessels start as open

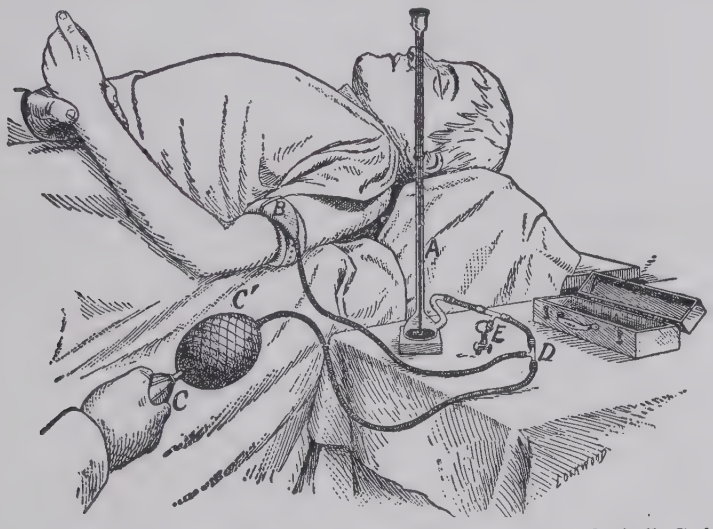


FIG. 212.—The band B is fastened around the arm; air is pumped by the bulb C through the tube D until the inflated band B pressing the artery against the bone stops the pulse at the wrist. The air pressure in B and D is registered on the column of mercury A.

mouthed tubes lying everywhere around the cells and any liquid or solid that gets under the skin or through the mucous membrane can get at once into a lymph vessel.

Disaster, however, would wait around every corner unless a way was provided to filter the lymph and thus keep dangerous substances out of the blood. These filters are called lymph glands. It is impossible for the lymph to get into the blood until it has gone through several of these lymph glands.

The little kernels that appear here and there under the skin are lymph glands. So long as their work is not too great they are small, in fact usually too small to be felt.

When they grow large enough to be felt it means something. It means that they are being called upon to do an excessive amount of work and they are striving hard to do it.

If they get tender and painful it means that the job is more than they can stand up under. The gland is straining out the germs and saving the blood stream from pollution but the poison is proving too much for the filter.

A swollen, tender, inflamed gland is in a bad condition but it is better that the gland should suppurate than that the blood stream should be polluted.

Blood Pressure.—*Mrs. S. G. writes: "1. Will you kindly state whether 150 m. m. is normal blood pressure for a man of 59 years? He is slightly pigeon breasted, and has had a hard winter cough—bronchitis—since childhood. He gets red in the face and neck at times, with no great throbbing of arteries. The physician calls it a vasomotor disturbance. 2. What is meant by 'vasomotor disturbance'? 3. After an operation for chronic appendicitis the colitis ceased, and last summer there was no recurrence of the trouble. He has been using a good deal of buttermilk (creamery). Can the ordinary lactic acid germ have given him relief? 4. How much credence should be given to the theory that buttermilk will stop putrefaction in the bowels and prevent arteriosclerosis? 5. Can vaccinating for 'colds' do any good? 6. Kindly tell those who cannot go to bed how to stop a cold."*

REPLY.—1. It is a little too high.

2. Blushing is a vasomotor disturbance. A vasomotor disturbance is a lack of proper automatic control over the size of the smaller blood vessels.

3. My guess is that his intestines were irritable from the appendicitis; therefore that the operation cured the intestinal trouble indirectly.

4. A little, not much.

5. Yes.

6. A purge, light diet, and a few doses of aspirin.

High Blood Pressure.—*L. H. writes: "1. Would a blood pressure of 200 and over—at times 230—be dangerous for one of 49 years who has a nervous heart, but otherwise is in good health? 2. What is apt to be the result from such a condition? 3. How high can the blood pressure run without causing paralysis at 50 or 60 years?"*

REPLY.—1. Blood pressure of 230 at forty-nine is about the limit. It indicates a bad condition.

2. Bright's disease, apoplexy, the tissue changes of arteriosclerosis.

3. The pressure does not cause paralysis. A high pressure may accompany brittle arteries and one of these may break, causing paralysis. You had better quit smoking, eat less, change your habits, and get your pressure down.

Temperate Living Urged.—*Mrs. I. S. K. writes: "A friend of mine suffers from too high blood pressure and hardening of the arteries. Her age is 65 years. Has been taking nitroglycerin tablets for six months four times daily, but so far has derived no benefit. Would you advise to continue the use or is there anything you could suggest?"*

REPLY.—Many people use nitroglycerin. I do not think it does any good. Prevent constipation. Eat, drink, and in all other ways live temperately.

No Great Danger.—*W. A. writes: "Is a blood pressure of 170 to be considered dangerous for a woman of 65, living under conditions almost ideally sanitary and hygienic?"*

REPLY.—170 is high for that age. That does not mean you are in great danger.

The Northwestern Life has found that the death rate among people with a blood pressure of 170 is 138 as compared with a normal for that

age of 100. In other words, you are in no great danger but your life expectancy is somewhat lower than normal for your age.

Altitude Effect Exaggerated.—*E. W. S. writes: "What precautions should a person take who is going to Colorado or some other point in the west of a high altitude, and who has 'leakage of the heart,' or valvular trouble of the heart? Is there any relation between 'leakage of the heart' and inflammatory rheumatism? Could one be said to be the cause or forerunner of the other; if so, which? What are the first symptoms of diabetes? What would you say was the cause of one requiring a great deal of drink (nothing stronger than water) especially in the evening after dinner?"*

REPLY.—1. Let him be careful about exercising. After a few weeks he will find that he has adjusted himself to the new atmospheric pressure. The effect of altitude on the heart is greatly exaggerated in the public mind.

2. Yes, inflammatory rheumatism is the cause or forerunner of much of the heart disease.

3. Generally an increased amount of urine and increased thirst. Sometimes a crop of boils or a carbuncle first calls attention to the existence of diabetes.

4. May be due to an overfull meal or to inactivity after eating. It is a good idea to drink a good deal of water after a full meal.

On High Blood Pressure.—*M. J. B. writes: "Will you please tell me what is the cause of high pressure of the blood and are there any serious results from too high pressure? What should the treatment be?"*

REPLY.—A high blood pressure means that (1) the heart is beating too strongly; (2) the blood vessels walls are thickened and inelastic; (3) the person is obese; or any two or all of these combined. Of these much the most important is the second. Naturally the blood vessels are large enough and smooth enough for the blood to flow through with very little friction. They are elastic enough to stretch like a rubber tube every time the heart beats. As age comes on the elasticity diminishes, the walls thicken, and the inside width of the tube gets less. In consequence the blood in the tubes is under too much pressure. High blood pressure is of importance, more because it is an indicator of senile changes in the tissues rather than on account of itself. For instance, it usually goes hand in hand with chronic Bright's disease—senile kidneys. About all that can be done is to live "slimmer."

Treatment of High Blood Pressure.—*L. C. R. writes: "I have what they call hardening of the arteries. About one year ago I was working in my yard and it was awfully hot. I got dizzy and fell and since then my right leg has been numb and I have dizziness when I walk. I am a man of 64 years old and my blood pressure at the present time is 172. Can you suggest where I could go or what is best for me to do?"*

REPLY.—People generally start to work on high blood pressure about twenty years too late. Eat lightly, eat simply, chew your food well, drink plenty of water, attend to your bowels, exercise moderately, keep happy, do not worry and you will be doing all you can do for high blood pressure.

Blood Pressure at Forty.—*A. M. writes: "The writer, age 40, recently applied for life insurance, and, though the application was granted, the*

examining physician expressed dissatisfaction with the blood pressure, saying it was 138, or within two degrees of 'the limit' for that age. Will you kindly say (1) how serious this record should be thought to be? (2) Whether medical advice should be sought? (3) Whether one may hope to reduce such a record of blood pressure, or only to prevent it increasing too rapidly? The writer's health is good, and he is commonly thought to be much younger than he is, but he has congenitally poor circulation, being troubled with hot head, cold extremities, etc."

REPLY.—1. For 40 years of age 138 is high. In the sense of immediate danger the condition is not serious. If one maps out a plan of proper living and follows it the condition may never be serious. I know a man whose blood pressure was found high twelve years ago. He was frightened and agitated about it for a while. Since then his first wife has died; he married a second time and that wife died. He married a third time and that wife is living.

2. Yes.

3. A sensible hygienic life may result in some lowering. It will surely result in a lower rate of increase.

High Blood Pressure Symptoms.—*J. B. W. writes: "Will you please state the cause of a high blood pressure, and also what are the symptoms?"*

REPLY.—A high blood pressure means that the elastic fibers of the walls of the blood vessels have been worn out and replaced by inelastic fibers. The cause is "wear and tear." "Wear and tear" may result from syphilis, lead poisoning, alcoholic addiction, overeating, overworking, worrying, and constipation. The symptoms are many. In a given case any symptom may be absent. There is an instrument for measuring pressure. Symptoms which suggest the need of this examination are dizziness, cold extremities, albumin in the urine, irritable heart.

Blood Pressure at 23.—*A. R. writes: "1. What is the normal blood pressure of an unmarried woman, 23 years old? 2. In a person who is anemic, what does a blood pressure higher than normal indicate? 3. What would it indicate should the blood pressure be lower than normal?"*

REPLY.—1. About 105 to 110.

2. If the person concerned is the woman referred to in the first question I doubt if her blood pressure would go above normal for long.

3. Probably a weak, flabby muscle and general lack of tone.

Leave the Bed.—*C. B. A. writes: "Kindly give me your opinion of a case of high blood pressure. Can it be cured, and how? Is there danger to a woman of about 47 years, who has had good health, as a rule, and looks well? The weight is about 150 and the height about 5 feet 7 inches. The patient has been in bed three months on a strict sweet milk diet. Should there be a diet, and of what, after giving up the milk diet? Is the condition critical at this time or later? Is traveling safe?"*

REPLY.—High blood pressure indicates long continued wear. The wear may be from overwork, or worry, lead poisoning, venereal diseases, stimulants or tobacco. Unless there is some special occasion for it there is no sense in going to bed for high blood pressure. A "one hoss shay" may be somewhat creaky but why have it if you do not use it? Get out of bed, go about your affairs, change whatever in your habits should be changed and you will do about all you can do for high blood pressure.

Milk, eggs and meat should not make up any considerable part of your diet. Eat lightly. You have been a sinner for forty years. You are now trying to escape your sins by being good and, as usually happens, you are too good.

Hemophilia.—*J. E. R. writes: "Please tell me why the daughters of bleeders should not have children. Where can I procure agar and what is a dose? Is there danger of its becoming impacted in the bowel?"*

Reply.—1. The sons of the daughters and sisters of bleeders are apt to be bleeders. Hemophilia [tendency to bleed] is inherited. It is an inheritance limited by sex. While only men have it it is transmitted only by women.

2. Your druggist can get it for you. You may eat a handful a day if you wish.

Nosebleed.—*G. A. C. writes: "I am troubled with nosebleed a great deal. My left nostril has bothered me the most. The secretions form a clot at the upper end of the nostril and it is necessary to remove it upon getting out of bed. The clot is about one-quarter of an inch across and quite thick. When I remove it the nostril always bleeds. It is very easily stopped by snuffing a little cold water up the nostril. Lately the right nostril has taken to bleeding, but it is hardly ever stopped up, and it is very hard to get it stopped. The right nostril bleeds very freely and the left very slowly. I find it necessary to pack the left nostril with cotton, sometimes two or three times. The blood seems to be of a good bright color. It bleeds at all hours—just starts itself. I am a locomotive engineer, and work nights. Have for years smoked a great deal, and drink lots of coffee. I do not use intoxicants."*

Reply.—If the cause of the bleeding is of a local nature then local treatment is all that is necessary. Such treatment consists in cleansing the nose thoroughly at night with a solution of warm salt water in the proportion of one teaspoonful of salt to one quart of water followed by a free application of boracic acid and lanolin.

The nose should not be blown hard at any time and picking is positively forbidden. Where crusts of scales form and it is desired to dislodge and remove them do this by first softening with warm water, vaselin or oil.

When nose bleeding persists it is usually advisable to have a physician or nose specialist if one is available.

CHAPTER XXXV

Apoplexy

APOPLEXY IS CEREBRAL HEMORRHAGE

Apoplexy stands near the top as a cause of death in old people. It generally disables for several years before it produces death; therefore, it stands near the top as a cause of disablement. After the blood vessel breaks and the blood pours into the brain, there is about a week in which the patient runs fever and is worse than immediately after the stroke. Then the paralysis of the tongue, face, arm, and leg slowly gets better.

The improvement is exceedingly slow, because a new set of nerve cells and fibers must be trained to do the work formerly done by those destroyed by the hemorrhage.

There are two phases of the subject worthy of some thought. The first is that there is usually a history of vertigo and nausea for a few hours preceding the attack.

Apoplexy runs in families. Therefore, if a man is of an apoplectic family and has arrived at the apoplectic age, he will be wise to watch his digestion closely, to live carefully, especially avoiding intemperance in eating and drinking, and, if he finds himself giddy and a little nauseated, to take a dose of saline water without delay.

The second point is this: After the fever stage has been passed a man can do a great deal to improve his condition. Regular massage to keep up the tone of his muscles will be of great service. When a man is learning to walk again he can be helped by experts in the training of his nerve cells and fibers to the new duties.

Careful watching will prevent the development of cystitis and Bright's disease, so destructive to the life of people of this group.

Apoplexy produces paralysis—but it is not a nerve or brain disease. It is the result of disease of the blood vessels in the brain. In the evolution of apoplexy the order of events is as follows: Rheumatism, gout, venereal disease, alcohol, lead poisoning, resulting in weakened patches in the brain arteries; a brittle area in a brain artery breaking under strain; outpoured blood tearing brain substance to pieces; paralysis from injured brain tissue.

The effective prevention of apoplexy lies in shielding the arterial walls from infection and mild poisons during the earlier years of life. Therefore the apoplectic looking for the cause of his condition must have his mind run back to the social history of his childhood, youth, and early manhood.

The usual story told by one who has had a stroke is as follows: For several days he had been feeling tense, with some tendency to vertigo, and possibly a little nausea. The blood in his vessels and the tissues under his skin

were under about as much pressure as they could withstand. There came a little change in position, a stooping, a little extra exertion, a vomiting spell, and—the weak place snapped.

If those having brittle arteries would recognize these tension warnings and take a laxative, eat lightly, and keep quiet until the vertigo and "biliousness" had passed, they would prevent the break—at least many would.

It takes nothing from the force of the first statement to say that a man who has lived wrongly and finds himself with brittle arteries can still be fairly successful in warding off apoplexy by temperance in emotion, excitement, work, straining, eating, and drinking. Nor does it make any difference that a tendency to gout and rheumatism runs in families; that some men are of apoplectic strain and others not. The man of a consumptive strain can afford to take chances by gormandizing; the man of a gouty or rheumatic strain cannot.

CAUSE OF APOPLEXY

The blood vessels of young people are very elastic. Their walls are largely composed of tissue having the quality of rubber. Such vessels do not break easily.

The wear and tear of life consumes this elastic tissue and causes it to be replaced by inelastic tissue. The "give" is lost, but the result is not a tendency to break. The worn man tires easily, is short winded, does not recuperate easily, has less than the normal reserve strength; but he does not have apoplexy.

The deacon's one hoss shay was as good in one place as in another. When it broke, it went all to pieces.

The man subject to apoplexy is not like the deacon's one hoss shay; he is bad in spots.

In his blood vessels are islands in which the live tissue of the vessel wall has been destroyed and removed and replaced by lime stones, called lime plates. Around the edge of these plates is an "easily broken" zone.

"Miscondition," the doctors call atheroma. Whenever in a man with atheroma the blood pressure exceeds the breaking point in these weak areas, a break occurs. If the break is in a brain blood vessel the result is apoplexy. Sneezing sometimes acts as a cause. A sudden jump in pressure and the vessel breaks. Straining from any cause is liable to produce the same effect.

However, apoplexy induced by coughing, sneezing, stooping, violent emotion, and so forth is the exception. The blood vessels are well protected from outside influences.

The rule is that the stroke comes in times of physical and mental calm. Usually there is a history of several days of slight disturbance of digestion and slight vertigo preceding the stroke.

Many who know their family tendency to apoplexy accept these signs as premonition and take a purgative. Some stop eating as a precautionary measure. These are proper procedures.

The trouble is not with the digestion primarily. Observations on blood pressure have shown that there is a progressive rise in blood pressure. The indigestion and vertigo are the direct effects of the high pressure.

To take a laxative and refrain temporarily from eating is both right and wrong.

It is right in that it gives temporary relief. It is wrong in that it emphasizes the digestion unduly. The moderation in eating for a day or two will probably be followed by systematic overeating.

WARNINGS AND PREVENTION OF APOPLEXY

What can a man who belongs to an apoplectic family do to prevent a stroke?

What can a man who has had one stroke do to prevent a second?

As a man who belongs to an apoplectic family approaches the apoplexy age, he should have his blood pressure taken once a year. If he finds that his blood pressure is more than 20 per cent above the normal for his age, he should map out his life in accordance with the facts. Thereafter he should go to a physician for a physical examination, including a blood pressure test, at least twice a year.

If the pressure warrants it, he should purchase a blood pressure apparatus and take his pressure at periodic intervals. A pressure apparatus is inexpensive. It is not difficult to use. No great technical skill is needed. A man of fair intelligence can learn to use it in two lessons.

Apoplexy is preceded by two warning signs. One of these is dizziness; the other is rise in blood pressure. Ability to use a blood pressure apparatus makes the second of these warning symptoms available.

An apoplexy warning having been recognized, the indications are clear. A saline purge should be taken at once. This should be followed by a dose of oil or calomel. The reason for reversing the usual order is that quick action is needed, and salines act quickly. A person with whom a saline does not act quickly should take an enema.

The diet should be very light for several days. The digestive organs should be given a partial rest. The system should have an opportunity to use up some of the excess nourishment stored up in the liver and elsewhere.

No tobacco should be used. Tobacco raises blood pressure. Even heavy tobacco users should "lay off the weed" until the vertigo period has passed.

FORMS OF PSEUDO-APOPLEXY

A number of years ago Weir Mitchell wrote about nocturnal hemiplegia. This disease is not apoplexy, but those who have it are usually much afraid of apoplexy. The patient wakes up at night to find that one leg and one arm or both legs are numb and cannot be moved. After a few minutes of rubbing, the symptoms pass away.

To prevent the attacks from coming back two things must be done: Take a purge and afterwards carefully regulate the diet, especially the evening meal. The amount of coffee and tobacco should be lessened. The second is to get a better bed. If the mattress has been hard, get a softer one. If an exceedingly soft mattress was used, get a harder one. Certain nerves have

gone to sleep because of pressure. This, however, is much more liable to happen in one who has been eating improperly.

Another condition which frightens people who are dreading apoplexy is night cramps in the calves. Night cramps are not related to apoplexy. They are not forerunners of apoplexy.

One who has night cramps should regulate his diet. Especially should he cut down on tobacco and coffee. He should also change his mattress so that he will not suffer from pressure. Night cramps are the result of lowered blood supply to the cramping muscles.

Not Apoplexy Sign.—*M. H. W. writes: "What should one do to avoid cerebral hemorrhage? I have had an ache at the base of my brain for some time. When I turn my head suddenly it causes pain there. I understand the symptoms are those that precede cerebral hemorrhage, and, if possible, I wish to avoid having it."*

REPLY.—To avoid cerebral hemorrhage, keep the bowels open well, eat lightly, refrain from vomiting, or any other physical act or any emotion which increases blood pressure in the arteries of the brain. These precautions are for those whose arteries are brittle, and liable to break under strain. Pain at the base of the head increased by suddenly turning the head is not a sign of threatened apoplexy. It bears no particular relation to apoplexy.

Due to Apoplexy.—*S. R. T. writes: "1. What is paralysis? 2. What causes it? 3. Can it be prevented? 4. Is it hereditary? 5. Can a man survive four strokes? I am troubled with dull pains in my lower limbs, numbness in my hands and feet, cold skin, dizziness at times, especially when stooping, dull pain at times in back of neck."*

REPLY.—1. I judge from question 5 that you have in mind the most frequent kind of paralysis—that which is due to apoplexy. In apoplexy a blood vessel in the brain breaks and blood flows out—a clot forms. This hemorrhage destroys certain nerve centers. The nerve centers usually destroyed are those of motion for a hand and leg. These limbs immediately become paralyzed and remain so until they come under the partial control of other nerve centers.

2. The arteries are made brittle by contagion in childhood, or rheumatism, or venereal disease, or lead poisoning, or overeating. They break from high pressure.

3. Yes, by preventing the cause. To prevent it, care must start in childhood.

4. In a certain sense—yes. There are "apoplexy" families. These are families in which members like to live high or have a tendency to heart disease, Bright's disease, or sclerosis.

5. Yes, he can, for there is no magic in numbers. But when a man's arteries have broken four times, the inference is that they are about worn out. Numbness and pains in the legs do not mean impending apoplexy.

Meat and Apoplexy.—*J. H. B. writes: "Does the eating of beef, pork, or mutton induce paralysis? Should one eat much after 40 years of age? Why are the sanitaria eliminating the use of meat with the paralytics?"*

REPLY.—Eating large quantities of pork, mutton, or beef has some tendency to produce apoplexy. Apoplexy follows a break in one of the

arteries of the brain. The arterial wall does not break until it is first diseased.

The most important cause of disease in the arterial wall is syphilis. I should say that lead poisoning is second. Alcohol and tobacco operate somewhat in injuring the wall and somewhat by increasing the blood pressure. A high protein diet is a factor and a prominent one. That means habitually eating heavily of meats. Habitual overeating of foods in general also causes it. Dr. Wedekind holds that eating foods that contain too much sodium chlorid (common salt) and other salts and drinking hard waters is another cause.

I have the impression that you are going off on a tangent. Excessive meat eating is an important cause, but you may exaggerate its importance.

CHAPTER XXXVI

Bright's Disease

A hundred years ago an English physician, Dr. Bright, discovered that albumin was present in the urine of certain patients who had dropsy. He came to the conclusion that the cause of dropsy was an inflammation of the kidneys which caused albumin in the urine. The disease came to be known as Bright's disease. Since that time every form of inflammation of the kidney has been loosely called by that name. In some of these inflammations there is a high percentage of albumin in the urine; in some there is none at all.

Ordinarily men judge of their condition by symptoms. If they have aches or pains or fever or cough or difficult breathing they think they are sick. If they have none of these they think they are well. When Bright wrote about the disease which bears his name he had in mind the people who had the symptom dropsy. But when the name came to be applied to all forms of inflammation of the kidney it was found that in some of them there were no symptoms except albumin in the urine, and people generally never thought of that as a symptom.

In no other disease is the unreliability of symptoms as a guide better shown than in Bright's. Most of the people who have Bright's disease have none of the ordinary symptoms which cause us to think ourselves sick. To this statement another should be added. There is no way to be on guard against Bright's disease except to have the urine examined once or twice a year.

FIG. 213.—METHOD OF COLLECTING A SAMPLE OF URINE FROM A MALE BABY.

When people began to hear about Bright's disease most of them learned of it as a disease which steadily grew worse and invariably caused death. There is variety in Bright's disease. There are varieties in which there are few symptoms and, especially worth noting, in which there is little tendency toward a fatal termination.

The object of this article is to teach people that when one case called

Bright's disease does not act like some other case the doctor has not made a mistake in diagnosis. The diseases are different, though they go by the same name.

With it there goes another lesson. There are no kidney cures. The so-called "cures" have no power to cure inflamed kidney tubes.

Then why do people buy and take medicines of this sort? Often it is because they have heard of some case which had Bright's disease, or thought he had it or was told he had it, and took one of them and got better.

While there are no patent medicines or domestic roots and teas which cure Bright's, there is no other disease in which carefully regulated living accomplishes so much. Most cases of Bright's get well. Many go through life fairly efficient and fairly safe. In a proper sense Bright's disease is a curable disease. The cure is early diagnosis, followed by right living.

WARNING OF BRIGHT'S

The Human Factor *informs us that in* 1914 100,000 *people died of Bright's disease in the United States;* that the death rate from this disease is increasing rapidly, 72 per cent in the last twenty years and 23 per cent in the last ten. The greatest rate of increase noted was 106 per cent in Richmond; the smallest, 16 per cent in San Francisco. Some increases in percentages were: Boston, 22; Chicago, 47; Memphis, 50; Denver, 36.

FIG. 214. — TEST TUBE USED IN TESTING URINE FOR SUGAR AND ALBUMIN.

Human Factor *says that 60,000 of these 100,000 lives could have been prolonged several years, and many thousands could have been saved had the disease been discovered in its early stages.*

The increase for a state was highest in New York, 132, and lowest in Montana, 52. This refers to the registration area. The states not in the registration area have no way of knowing what is happening to their people.

FIG. 215.—HALF A KIDNEY SHOWING SUPRARENAL (or adrenal) KIDNEY STRUCTURE, PELVIS OF KIDNEY AND URETER.

The kidney is an exceedingly vulnerable organ. Severe illness of any kind is nearly certain to cause some Bright's disease. This is especially true of pneumonia, scarlet fever, diphtheria, and rheumatism. In addition, overeating, overdrinking, and overworking put the kidneys under great strain.

Whatever the nature of the overload, the organ carries it as best it can. When the strain is too great and the kidney gives down under it there is no pain, no ache, no complaint of any character. Albumin and casts appear in

the urine, but a laboratory examination is required to show it. Swelling of the feet, puffiness under the eyes, short wind—these speak for the kidneys, but the disease has progressed far before they show themselves. The kidneys do not complain.

To warn their people in time one life insurance company will make an examination of the urine once a year for any person who has been insured with it three years. If the party insured is in one of the company's central points a physical examination also will be made.

This type of service was begun by another company a year or two ago. It is spreading. Other companies are adopting it. A life extension institute has been organized to make the same sort of service available for any life insurance company or any organization desiring it. Treatment is not the object of this service. Its object is to discover organic diseases in their beginning stage.

The man who thus discovers that he has an organic disease in its early stage may be able so to change his habits as to cure his disease. In the great majority of cases he can prolong his life five years or more by changing to a thoroughly hygienic method of living. Medical service can promise much when the trouble is just unfolding.

The insurance companies feel that people past middle life are neglected. Health departments have not been much interested in the welfare of this group. The work inaugurated by the companies for their policy holders will eventually be furnished by health departments to all the people.

ACUTE BRIGHT'S DISEASE

Acute Bright's disease frequently results from an infection. The effect elsewhere in the body may be slight, yet the poison may set up an inflammation of the kidneys. On the other hand, the infection may be profound in its effect on other parts of the body, yet the kidneys may escape.

While any type of infection may cause acute Bright's disease, some are much more prone to do so than others. Scarlet fever and pneumonia infections are trying on the kidneys; common colds and typhoid fever are not. Acute rheumatism, though it is accompanied by highly acid, highly colored, and greatly concentrated urine, is not likely to set up an acute Bright's.

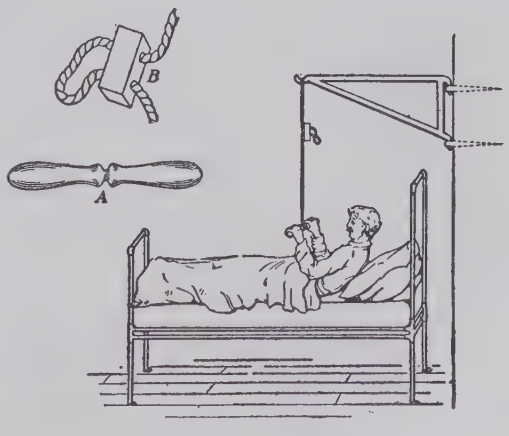


FIG. 216.—BED GRAPPLE.

Occasionally an acute Bright's disease is spoken of as being apoplectiform, meaning a person previously well is suddenly and violently stricken by

unconsciousness or convulsions, or both, as the result of an acute developed Bright's. That way of oncoming is exceptional. The usual method is subtle: A child sick with scarlet fever is not doing so well as it should; it is difficult to see just what is the trouble; a chemical and microscopic examination of the urine shows albumin, casts and probably blood present.

The teaching of all this is that in any condition which throws a strain upon the kidneys the urine should be examined as a matter of routine. It should be done as systematically as taking temperature, counting of the pulse, or looking at the tongue now is.

I do not mean that it should be done several times a day. The frequency should be determined by the disease and by the other indications—in scarlet fever and pneumonia every day, in typhoid once a week, in tuberculosis (and pregnancy) once a month.

It should be done for the same reason that a trackwalker walks a railroad track or a man comes around and taps the car wheels at every division point. In cold weather the greater the need that the trackwalker watch closely for broken rails, the greater the need that the wheel tapper listen well for cracked wheels. The wheel tapper usually finds the wheels all right, and not every broken rail causes an accident. These results are arguments for and not against track inspection and wheel tapping.

INFECTION OF THE KIDNEYS

The kidneys are loosely connected with the tissues which surround them. In consequence infection of the spine (Pott's disease), or of the muscles (psoas abscess), or the peritoneum (peritonitis) — all near-by structures — seldom spreads directly to the kidneys. Around each kidney is a tense, almost impenetrable capsule which shields it from the infections of its neighbors.

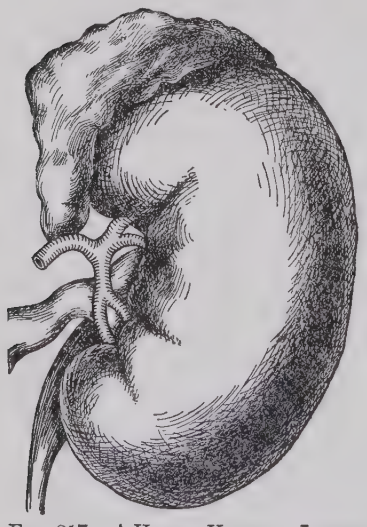


Fig. 217. A Human Kidney a Little More Than One Half Natural Size in an Adult.

Infection can travel to the kidney by the blood stream and up the ureters from the bladder. The most frequently infecting organism is the colon bacillus, the organism which, so long as it stays in the large intestine, is nearly harmless. Another one frequently found is the proteus, a germ which of itself is quite harmless but which ferments the urine and manufactures a lot of ammonia which irritates and harms the kidney.

Another important group is the ordinary pus cocci, which may have traveled to the kidney in the blood, but which usually have traveled from the bladder, in cases of cystitis, up to the kidney. Another of some importance is the tubercle bacillus. The Phipps Institute found Bright's disease frequently

present in the later stages of consumption, but that is a different matter from infection of the kidney with tubercle bacilli. Tuberculosis of the kidney is usually unassociated with consumption.

Gonococcus infection rarely travels to the kidney. Sometimes it does, but in most infections of the kidney, following a gonococcal infection elsewhere, complicating bacteria are responsible.

Whether or not a person is to get an infection of his kidney depends largely on himself, and that is the reason for this article. A large group of the cases is due to the use of dirty catheters and other dirty instruments—not dirty in the sense that a garbage can is dirty, but laden with enough bacterial life to infect the bladder or the urine in the bladder, whence the infection travels to the kidney. Especially are men with enlarged prostates liable to forget at times the necessary precautions during the years of continuance of the condition. Eternal vigilance is difficult when the need is drawn out for ten to thirty years.

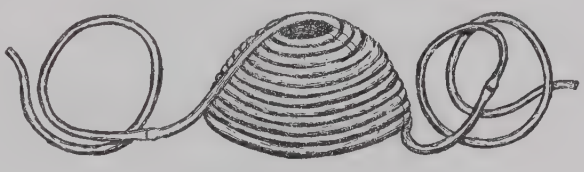


Fig. 218.—Head Coil.

Osler's "System" says: "It is advisable to give plenty of water in severe febrile diseases, in pregnancy, and in the latter case to insist upon a certain amount of rest in the prone position, and in addition to this, as in all other conditions, to build up the patient's general health, avoiding above all things constipation. . . . It is therefore important to avoid all irritating drugs, to use the greatest care in the use of instruments, to avoid introducing infection or producing trauma, to treat with care and promptness all cases of cystitis and gonorrhea, to remove if possible all causes of stasis, such as strictures, prostatic enlargements, and stone; . . . to use large quantities of water."

The quack medicines so widely advertised and so widely used for a certain infection can be classified as irritating drugs, such as copaiba, cubebs, sandalwood, and turpentine.

CHRONIC BRIGHT'S DISEASE

The man who has gouty kidneys suffers no pain and does not feel very different from the ordinary man. He is a little short winded, but to him that does not mean much, because most of those who have it are old enough to be slowing up. It follows that the condition is frequently discovered by accident—a urine examination for life insurance, for an operation, or for some purpose and, presto! albumin and casts are found. A few years ago a famous teacher in Tulane, demonstrating to his class, discovered that he had advanced and advancing Bright's disease.

"Bright's disease of the kidneys" is about as indefinitely used as "catarrh of the head." It includes an acute inflammation of the kidney due to an acute infection of the kidney, which, like a pneumonia infection, runs a short, sharp course and terminates in death or in recovery. A progressive form is one in which there is much dropsy, while the chronic, or gouty, form, which causes

few symptoms, but does not improve, has little tendency to kill. Where it causes death, it makes a fatal disease out of an otherwise mild infection, such as colds, bronchitis, pneumonia, typhoid fever. It is insidious. It is the punishment for years of wrong living. It shows full meals, nutrition out of balance, constipation, lead poisoning, venereal disease, bad colds, pneumonias, contagious diseases. Neglect before fifty means Bright's disease afterward.

A great many people are interested in how to live with Bright's disease, for it is a condition, not a disease.

Osler, writing of some cases of chronic Bright's disease of which he had

FIG. 219.—COLD WATER COIL APPLIED TO ABDOMEN.

known as living twenty years with the condition, sums it up by saying that the man with chronic Bright's disease is no longer No. 999 drawing the Empire State Express, but is a dinky switch engine. If he will allow the Bright's disease to teach him temperance it will be an advantage and not a disadvantage.

The man who keeps his skin warm, eats temperately, avoids excesses, avoids colds and other infections, will live to a comfortable old age in spite of his crippled kidneys.

Some day it will be the custom for men who think themselves well to have a complete examination at stated intervals—to take stock—and then govern their lives in accordance with the findings. This means efficiency as well as security. Efficiency and security are the watchwords of the health movement.

CHRONIC BRIGHT'S DISEASE WITH MUCH ALBUMIN

There is a form of Bright's disease characterized by much albumin, many casts in the urine, and by a marked dropsy. The dropsy in Bright's disease usually shows itself by puffiness under the eyes. This puffiness comes on before swelling of the feet appears. From the loose tissues under the eyes the water logging process extends, first involving other loose tissues and finally becoming universal.

Frequently this kind of Bright's disease goes hand in hand with related changes in the heart and liver. The heart muscle becomes weak and flabby and the liver swollen and pale. This group of moderately progressive cases acts as if some fairly active cause were carried around the body by the blood, poisoning all of the delicate tissues with which it came in contact and slowly destroying some of the most necessary of the body tissues.

FIG. 220—ARRANGEMENTS FOR PROLONGED BATH. To be used in sunstroke, fevers and alcoholism.

Many causes operate to bring about this disease. Drink is one of them; others are lead and mercury poisoning and the different varieties of venereal disease. Bakers, butchers, and icemen have more than their share of it, because they work in damp places, some of which are too hot and some too cold. Underground and cellar workers of every sort get more than their share. But the most important cause is consumption. About one-fourth of all the cases occur in connection with consumption.

Within the last few years it has been the custom to restrict the amount of salt given patients with this form of Bright's disease.

A few years ago Fischer wrote an interesting book on the reasons why water sometimes soaks into the tissues in too great quantity. In other words, why dropsy occurs. His conclusion was that in such cases there was too much

acid waste or ash in the tissues; that the tissues, instead of burning completely, as they should, made slag or something corresponding thereto, and if there were plenty of oxygen this was not so liable to happen.

One of the practical applications of this discovery of Fischer's is that we decrease the amount of swelling in the milder conditions of dropsy if we give the patient plenty of fresh air. This is why these patients do so much better in the open air than in tightly closed, badly ventilated hospital wards—those of the old type. For the same reason in part these patients do better when they go South for the winter, assuming that they stay out of doors when they get there.

Another practical suggestion is that, by the use of a solution of salt and soda, the edema can be materially reduced. However, this last is not of much importance since it strikes at the effect rather than the cause.

We do not know how to strike at the cause after the disease is established. About all we can do is to protect and shelter the vital forces, keeping the patient as comfortable as possible, meanwhile hoping that this particular case may be one of those relatively few when nature seems to be able to arrest the progress of the disease.

VERY SLOW BRIGHT'S DISEASE

Brault speaks of this form of Bright's disease as nephritis from slow poisoning. It is the kind that develops in people at and after middle life. That form causes but little dropsy. There may be some puffiness around the eyes and, later, a little swelling of the feet, but there is seldom much dropsy. The urine is pale in color, copious in quantity, low in gravity, contains but a trace of albumin and only a few casts. Sometimes there will be long intervals during which there is no albumin and no casts.

It is caused by gout, alcohol, overwork, worry, overeating, lead poisoning, and venereal disease. It is the disease of the bon vivant. Usually the cause is some mild poison scarcely detectable as a poison, some chemical substance which wears just a little more than the average but which just keeps on wearing until a condition is brought about at fifty which would be about normal at eighty.

Water falling drop by drop on a stone will wear a hole, yet if one were to judge from the force of the fall of any one drop, he would say so insignificant a force could never channel through solid rock. But mild irritations, long continued, bring senility a few decades before it is due.

Another group of cases stands for the scars of acute infections, especially in childhood—such infections as scarlet fever, diphtheria, and pneumonia. At the time of the original illness kidney cells were destroyed and scar tissue started to grow. This scar tissue did no particular harm until, having grown old and firm, it contracted and thus puckered and squeezed the kidney substance.

Several years ago Osler wrote an article on "The Advantage of a Few Casts and a Little Albumin." A Canadian statesman who had been pronounced incurably sick with Bright's lived a useful life, though a very tem-

perate one, for twenty years after Osler pronounced his sentence. Several other cases were cited.

A man in good health whose tissues have the spring of youth can overeat or overdrink or work in lead and not feel the effect for a long time, possibly never. There is about it a certain element of gamble. A man with a chronic Bright's must behave himself. He has no option. For him to play the game is about the same thing as sitting in where the other fellow has the cards marked. There isn't even a gambler's chance.

KIDNEY OF PREGNANCY

Women with Bright's disease are liable to become pregnant. The progress of the changes in the kidney when Bright's disease was present before pregnancy occurred is different from that when the kidneys were in good condition at the beginning of pregnancy.

Pregnancy occurring in a woman with a preëxisting Bright's disease is to be watched more closely than where the kidneys were normal to begin with. But, watched closely, there is an excellent chance that the woman can be carried through without accident. Of course, albumin and casts in the urine of a woman with a preëxisting Bright's disease does not indicate that she is being harmed by her pregnancy, as does this sign when Bright's disease was not present to begin with. When the pregnancy has caused the albuminuria, it means that the task on the kidneys is too great. If the albuminuria existed first, the kidneys may be standing the strain without trouble.

Every woman should have a urinalysis made soon after pregnancy is determined to discover whether she has Bright's disease or not. At that early stage one can be certain that sound kidneys are equal to the extra burden of the pregnancy. If albumin and casts be found and further examination confirm the existence of a Bright's disease, during the rest of the pregnancy the woman must be watched closely for evidence that her kidneys are not failing to do their work, and everything possible must be done to lighten the kidney load.

Women who start out with good kidneys not infrequently develop what is known as the kidney of pregnancy. Some writers think the great change from the usual routine in the machinery within the abdomen causes bacteria to be absorbed from the intestines and that these, being excreted by the kidneys, cause the kidney of pregnancy. Some think the pressure of the heavy uterus, supplemented by the weight of the child, is responsible for the kidney condition.

The great Virchow, the father of pathology, brought prominently forward the theory generally accepted now. It was that pregnancy put a fearful strain on the kidneys of the mother. There is the waste of the baby—and rapid growth means much waste—the waste of the rapid pregnancy changes in the mother and the usual daily waste—all to be got rid of, and much of it by the kidneys. This theory is that the toxins overload the organs and the kidney of pregnancy develops.

Usually the first suggestion that the condition is present comes in the shape of a laboratory report. Albumin and casts have been found where no particular symptoms suggested things were not going right. Sometimes head-

ache, dizziness, sleeplessness suggests that something is wrong, and urinalysis shows what the trouble is. Sometimes there is but little albumin and casts are quite abundant—so abundant that they will not be overlooked by even the most superficial examination. In fact, many families provide themselves with a test tube and some nitric acid and do their own routine testing.

ALBUMINURIA IN PREGNANCY

When albumin is discovered in the urine during pregnancy the woman must be watched closely. In the first place an effort should be made to decide whether the kidneys were sound when the pregnancy began. The history, the condition of the heart and blood vessels, and the presence or absence of changes in the retina will usually settle this question.

If it be found that Bright's disease preceded the pregnancy, then one must judge of the ability of the diseased organ to withstand the strain. The evidence of albumin in the urine does not mean that the kidney is not standing up. If it be found that the albuminuria has developed after the pregnancy, then its presence means that the kidneys are not wholly up to the demand, and the question then to decide is whether they can be nursed along.

This question cannot be decided at once. It must be held open and close watch be kept on the quantity of urine, the amount of albumin, casts and blood, and the evidence of intoxication in the patient—headache, dizziness, sleeplessness, and dimness of vision. The degree of dropsy must be closely watched, If the mother can escape convulsions the chance that both she and her baby will escape is great. If she gets convulsions the mother will recover three times out of four, but the baby will not fare so well.

The later kidney effects do not seem to be especially bad. If the woman recovers there does not seem to be the same trail of chronic Bright's disease that we get after scarlet fever and rheumatism.

The preventive treatment is much a matter of being on guard—watching for a little puffiness of the eyes or feet, a little albumin or casts, headache, restlessness.

Dr. Herrick says, in Osler's "System," "The prejudice of even the civilized woman against ordinary cleanliness of the skin because of fear of catching cold, her aversion to exercise, particularly in the later months of pregnancy, and especially in the open air, the frequent obstinate constipation, the faulty performance of function on the part of the stomach, sluggish action of the kidneys—these are some of the explanations offered for the accumulation of an undue amount of toxic material in the blood of the pregnant woman, which substance may harm the delicate renal parenchyma."

The items embodied in the above collection suggest measures for the preventive treatment of the kidney of pregnancy. Of greatest importance is the prevention of constipation. It is a little too much to ask the kidneys, already doing work for mother and child, to take up the work of the bowels in addition.

TO TEST URINE FOR BRIGHT'S DISEASE

There are needed:

A test tube,
An alcohol lamp,
Some strong nitric acid (white),
A medicine dropper.

About a half-inch of nitric acid is placed in a test tube. The acid is gently warmed over the lamp. It must not be boiled. With the medicine dropper a half-inch of urine is carefully run on top of the warm acid. If a white band forms at the junction line of the two fluids, albumin is present. If albumin is found its presence should be verified by a laboratory.

This test does not show casts. Albumin may be present from some cause other than Bright's disease. Bright's disease may be present where there is no albumin in the urine. These are the exceptions. The rule is that albumin in the urine means Bright's disease.

BRIGHT'S AND DIABETES

Most chautauquas give personal and public hygiene a place on their programs. Many arrange for a daily talk on some phase of personal hygiene, since personal hygiene is of interest to so large a group of people. Recently, I attended one of these chautauqua talks on personal hygiene. The subject announced was "Diet in Relation to Disease." When the bell rang the audience gathered from all parts of the grounds. It was a late afternoon hour and the proportion of women to men was about four to one. More than half the audience had notebooks, and they used them.

When the lecture was finished, questions were fired at the lecturer from all parts of the hall. The questions showed that the audience had a fair grasp of the subject. The speaker had been trained in a low protein school and her teaching was based upon the theories which prevail there. Nevertheless her first subject was the tea and toast meal of the unmarried woman.

She told of calories; what a calory is; how many calories the body needs, and how toast fails to supply fully the need, while tea is used to whip the underfed, fatigued cells to do their work.

However, the theme on which the lecturer especially dwelt was overeating. She emphasized the folly of taking more calories than the machine needs. Not only is it wasteful, but in time it brings about obesity, Bright's disease and diabetes.

She told her audience of the insidious onset of both Bright's disease and diabetes. Neither had a single outstanding symptom, one capable of halting a careless person. But each had a symptom capable of arresting the attention of a careful person. The symptom of Bright's was albumin in the urine; of diabetes, sugar.

The lecturer advised her hearers to make the simple tests required at

least twice a year. The only equipment needed is an alcohol lamp, a test tube, a little nitric acid and a little Haines' solution.

To test for albumin an inch of urine is placed in the test tube, and brought to a boil. If the urine becomes cloudy on boiling, three drops of nitric acid is added. If the cloudy urine remains cloudy, it is due to albumin, and Bright's disease is present.

To test for sugar, an inch of Haines' solution is placed in the test tube and brought to a boil. Then ten drops of urine are added. If the deep blue solution changes to a muddy yellow or reddish yellow, sugar is present, and the patient has diabetes. If either test indicates anything wrong, the person should seek medical advice.

KIDNEY CURES

The kidney cures have been popular frauds for years. The reason these compounds have sold is because they have traded on a popular belief. Our forefathers grew up on the idea that certain drugs were "good for the kidneys." They thought asparagus and onions were good for the kidneys because of the odor of the urine after these vegetables had been eaten. They thought gin and juniper berries were good because of the large quantity of clear urine after one had tanked up on gin. Niter and sweet spirits of niter are other compounds that have had reputations as "good for the kidneys."

Along came the patent medicine man and he traded on these old-fashioned notions. He called his medicine kidney cure and kidney medicine. He usually advertised that his medicine contained juniper berries, asparagus, and other "yarbs" of repute.

Probably the medicine did contain them. There must be some flavor, and these different roots and herbs are as cheap as anything. Gin is as good a solvent as other forms of alcohol, and the cost is not prohibitive. Therefore, why not make use of the advertising values of these traditional kidney remedies?

Now, what are the facts? Much the best kidney stimulant is water, just plain tap water. The amount of urine can be increased by digitalis, or niter, or gin, but it can be increased more and in a better way by taking a few extra glasses of plain water.

If one should drink gin and stimulate the kidneys to take an excess of water from the blood, he would be worse off therefrom until he had filled up the deficiency of blood by drinking water.

Another excellent way to stimulate the kidneys is to permit the skin to get cold. If a man has any reason to feel that his kidneys should secrete more freely, he does not need to take a tablespoonful of kidney cure. Let him walk out of the office without his overcoat on any cold day; let him stroll a few blocks leisurely or stand on a corner until he gets chilled through. This "medicine" he will find much more effective than kidney medicine taken from a spoon.

Of these two suggestions, the first is much to be preferred. The suggestions are offered those who take kidney medicine for "pain in the back," "heavy feelings" or "scant kidney secretion."

If a person has any form of Bright's disease, it is because of some error in

his way of living, or because somewhere his machine is slipping a cog. Most cases of Bright's disease get well, at least for a time. Of those that are not recovered from, most are of such a nature that they can be lived with for years.

A sensible person can usually round out a full life in spite of Bright's disease. The only cases of Bright's that are cured by these remedies are those that were cured in spite of the remedies.

The treatment of Bright's that gets results is right living under intelligent medical control.

BRIGHT'S DISEASE TREATMENT

Some time ago we published (in the *Chicago Tribune*) a letter from J. E. Hardy in which he said that he had cured himself of Bright's disease. Many wrote asking for Mr. Hardy's address. We adhered to our rule and declined to give this information. However, we wrote to Mr. Hardy, requesting him to write out his method, that we might publish it for the benefit of many who had written. We have been compelled to abridge his letter.

He writes, however, that he is willing to answer letters and submits his address. Letters sent to him must include stamped envelope; otherwise the burden would be unreasonable. Mr. Hardy resides at Victor, Colorado.

Many cases of Bright's disease get well; others live to a ripe old age. We are always liable to fall into errors when we draw conclusions as to all mankind from one experience with one man. Mr. Hardy's temperance and right living are right. With some of his food ideas I cannot agree.

J. E. Hardy writes: "About twenty years ago I was informed by a physician who has since died of Bright's disease that I had that much dreaded malady and that I had only six months to live. There is no doubt that this diagnosis was correct because I had it confirmed by several physicians. The fact that I am alive and enjoying life, although I am past 54 years of age, speaks volumes for the methods I have used.

"Dear reader, this article will mean little to you if you are unwilling to deny yourself. If you are determined to eat and drink various articles just because you enjoy their taste and you do eat these articles just to gratify your appetite, although you know they are injurious, then these suggestions are of little worth to you. Your health and future happiness depend on what you eat and drink and what you do not eat and drink, together with your manner of living.

"Do not drink milk, cream, tea, coffee, cocoa, chocolate, beer, whisky, wine, hard cider, soda water, mineral water, or any fancy drink sold at a drug store or over a bar. Avoid all hard waters and waters impregnated with minerals and alkalis. Drink nothing but soft water. Eat all kinds of grains, such as wheat, oats (oatmeal), corn (cornmeal mush, corn bread), rice, barley, rye, flaxseed, boiled whole wheat, whole wheat mush, parched whole wheat mixed with flaxseed and ground. Whole wheat bread should be eaten at every meal. Whole wheat can be purchased at all seed stores and at most of the feed stores.

"You can make your own whole wheat meal or flour by grinding whole wheat in your coffee mill, after having thoroughly washed the wheat and

letting it dry. This whole wheat meal makes excellent gems or bread. When prepared like oatmeal mush it makes an excellent and inexpensive breakfast food and is beneficial to those who are troubled with constipation.

"Take equal parts of whole wheat and flaxseed. Parch this combination in a pan on the stove. When slightly parched grind in a coffee mill. Eat freely at your regular meals and you will have no more trouble with constipation.

"Eat potatoes and all legumes, viz., beans, peas, lentils. Avoid canned beans; Mexican beans are preferable. Eat apples freely, uncooked principally. Eat figs if they agree with you. Nuts are permissible, provided they do not produce constipation.

"Avoid all forms of animal foods, such as milk, butter, eggs, grease, oysters, meats, fats, glands, thymus, liver, sausage, cheese, gelatin, fish, calves' foot jelly, and similar dishes.

"By avoiding the following articles of food, which contain oxalic acid, you will escape uremic poisoning and those sick spells: Spinach, sorrel, lettuce, rhubarb, cabbage, turnips, olives, gooseberries, currants, plums, strawberries, raspberries, grapes, cranberries, apricots, peaches, horseradish, olive oil. Avoid sugar and all sweets. If you must have some sweets experiment with pure maple syrup or saccharin as a substitute for sugar. Bananas should be avoided by most persons.

"Avoid the use of pepper, salt, mustard, pickles, essential oils, spices, ice cream, flavoring extracts, catsup, and all condiments; also all rich and indigestible pastries and cake. Avoid the use of tobacco in every form.

"Drink a glass of lemonade once or twice a week. When the kidneys are sluggish, drink corn water, which is made by boiling one cupful of common field corn in two or three quarts of water for five or six hours.

"An absolute fast for one, two, or three days will correct these sick spells by giving nature a chance to throw off the accumulated poison in the system.

"Eat three regular meals per day. Do not overeat. Eat at the same hour every day. Do not eat between meals. Do not eat late suppers. Eat slowly and masticate your food thoroughly. Do not drink more water than your natural thirst demands.

"Keep the pores of your skin open by frequent baths, say two per week. One of these should be a hot steam bath, if possible. Bathe your feet frequently.

"Sleep with your bedroom windows open every night during the year.

"Keep your living rooms well supplied with fresh air.

"Take plenty of outdoor exercise. Walk several miles each day. Commence your walking exercise gradually.

"If you are dropsical I suggest that you live in a high, dry climate.

"One who lives on milk and vegetables is not living on a strict vegetarian diet. I cut out milk many years ago.

"Rice as an article of diet cannot be too highly recommended. Boiled rice is easily digested, and as it contains less alkaline salt than any other food, it does not overtax the kidneys. Be careful to use the unpolished rice, because the polished rice is coated with paraffin and talc, and, like white flour, has been robbed of its most health giving and nourishing qualities.

"You may think this treatment is a strenuous dose. Well, possibly it is

somewhat heroic, but remember you are playing for big stakes—life, health, and happiness. Is it not worth while? Give it a trial."

Water and Bright's.—*L. C. R. writes: "You have written a series of articles on the spring waters in this country. I would like to know whether you could tell me what is the best water for Bright's disease."*

REPLY.—People with milder forms of Bright's disease generally get help from the free use of waters containing very little mineral matter, such as Chippewa, Poland, Waukesha, and Mountain Valley. People with the acute forms of Bright's disease are sometimes helped by the bitter purgative mineral waters.

No water is a specific for Bright's disease or any other disease. The composition of the water is of minor importance as compared with the method of use of the water. We have better waters than those of the famous cures of Europe. Our hope of developing cures equal to those of Europe lies in the possibility that we shall learn that it is the method of use and not the chemical constitution of a mineral water which counts.

Bright's Disease Diets.—*C. R. writes: "Will you kindly let me know what to eat? I have Bright's disease. Will Hot Springs, Arkansas, cure me?"*

REPLY.—I wish I could answer your question in detail and not mislead you a bit. I am afraid to try.

Bright's disease is of several varieties, and the diet good for one is not good for another. If you have acute Bright's disease you should go on a very limited diet. The skim milk cure has helped some. If you have a form of chronic Bright's you must eat more in order to nourish your body, but still you must eat much less than does the average well man. Von Noorden has a valuable little book on diet in Bright's disease. Suppose you get that.

No spring water will cure you. The waters of some springs are of great service in the treatment of certain forms of Bright's, particularly the cases that have a good deal of albumin in the urine. Mountain Valley and Potash-Alum Springs, near Hot Springs, are good.

Bright's Disease Ration.—*S. I. K. writes: "What diet should one take who has albumin, a symptom of Bright's disease? What is the best section of the country for one having Bright's disease, or endangered with the malady, to live in? Is it harmful for one having this disease to work indoors?"*

REPLY.—1. Eat what you please, but not so much as you please. Cut in half the amount of meat in your daily ration. Reduce the quantity of food other than meats one-third. Take no whisky nor beer. Be temperate in all things. Avoid getting wet or cold. Avoid infections of every kind.

2. A warm, even climate, such as southern Florida, California, the Gulf coast.

3. Not especially.

Interstitial Nephritis.—*L. C. M. writes: "1. What is interstitial nephritis? 2. Does blood pressure above normal and arteriosclerosis usually accompany this disease? 3. Is it slow or rapid in developing? 4. Is apoplexy liable to occur from this disease if arteriosclerosis is present also? 5. What are usually the last stages?"*

REPLY.—1. The slowest form of Bright's disease. It is a mild, chronic inflammation of the kidneys.

2. Yes.

3. It develops very slowly. While it is incurable, ofttimes it is without symptoms. Sometimes the symptoms are very mild. Often people with this disease live long and comfortable lives.

4. Apoplexy in people with high blood pressure and chronic Bright's disease is rather frequent.

5. Death is generally brought about by some intercurrent, acute disease, such as pneumonia or acute Bright's disease. The symptoms in that event would be those of the intercurrent disease. Death frequently is from uremic coma. Sometimes it comes with the symptoms of an advanced arteriosclerosis.

To Avoid Uremia.—*E. L. L. writes: "What foods should be avoided if there is a tendency to uremia?"*

REPLY.—Overeating is much more important than anything else. A low protein diet is advised, one consisting largely of milk, buttermilk, cheese, fruits, and vegetables. The amount of meat and bread in a low protein diet is not over half that usually taken.

Symptoms of Bright's Disease.—*M. E. S. writes: "What are the symptoms of Bright's disease? Is there a swelling of the kidneys, face, and eyes? Also the feet? Is there a certain diet for it? The person in question is only 18 years of age. For a time she seemed to be doing very well, but is now in a very serious condition. Probably it is not Bright's disease, but that is what we think it is. A doctor at one time said it was kidney trouble."*

REPLY.—Examination of the urine shows the presence of albumin and casts. This is the best sign. Puffiness around the eyes is often due to some other cause. At the same time it is one sign of Bright's disease. The same is true of swelling of the feet.

Most cases of Bright's disease respond to change in living habits. In fact, right living is the only treatment needed in a fair proportion of the cases of Bright's.

Dieting is an important feature of right living. The first essential of dieting for Bright's disease is never to overeat. The second is to eat simple foods. The third is to decrease materially one's consumption of savory meats—juicy steaks. The fourth is to cut the amount of protein eaten about in half.

Try Dieting and Exercise.—*H. E. B. writes: "What causes the albumin to go into the urine? Is it a sure sign of Bright's? What articles of food should be excluded? What is the best medicine to take? When the blood is poor from malaria and taking quinin, what is the best thing to take?"*

REPLY.—1. The albumin is held in the blood by the kidney cells when they are normal. When they are diseased some of the blood albumin passes through the diseased cells into the urine.

2. No; it is, however, reasonably sure, and that is about as much as we can say of anything. Sometimes albumin is present when there is no Bright's, and sometimes Bright's is present when there is no albumin.

3. In chronic Bright's disease, be sure to eat enough nutritious food, but be sure not to eat too much. In acute Bright's eat lightly of meats

for, say, a month. Don't stop eating meat entirely in acute Bright's, and certainly not in chronic Bright's.

4. Instead of relying on medicine, have your physician outline a plan of eating, exercise, and personal hygiene, and follow it. If you put your dependence on kidney cures, you for the scrap heap.

5. Iron tonic, good food, and exercise in the open air.

Loss of One Kidney.—*H. J. C. writes as follows: "1. My brother, a boy of 18, has had one of his kidneys removed by a recent operation. Does this lessen the chance of his ever becoming strong and robust again?*

"2. A. C., aged 37, has for years been annoyed by a cough which comes on suddenly if he should sit in a draft or at an open window, or even out of doors at night, regardless of how warm the weather. During the winter months bedroom windows cannot be left open at night or he will cough most of the night. It is only at these stated times, however, that said cough puts in an appearance. From this information what would you say it was caused by?

"3. What is glycerin made of? Have been using it on hands and lips at night, and have been told it is drying. Would it hurt a person if he took any quantity of it?"

Reply.—1. If the remaining kidney is sound, he should get as strong as the next man. A normal man has a great excess of kidney capacity. One healthy kidney is more than ample.

2. A. C. coughs when, by reason of chilling of his skin, his outside blood pressure is lowered and his internal blood pressure is increased. If he will use more cover on his bed and wear more clothes when exposed to chilling, he will not have the coughing spells. In some way or other, the increased internal pressure on the skin reflexes irritate his bronchial tubes. In some cases it is thought the irritation comes from enlarged bronchial lymph glands which swell when the skin is chilled.

3. I think usually from alcohol. It dries. By itself it is not good to take nor to put on the hands. In Arizona it is wise to grease the skin frequently with a grease gum mixture to which some but not much glycerin can be advantageously added.

Tubercular Kidneys.—*L. A. T. writes: "1. What is the cause of tubercular kidneys? 2. Would 'dope' produce a condition leading to this condition or an appearance of this condition?"*

Reply.—1. Tubercle bacilli cause tuberculosis in the kidneys as elsewhere. Sometimes the bacilli get into the blood and are carried in that way to the kidneys. In this condition the tuberculosis is not limited to the kidneys, but is everywhere throughout the body. Sometimes the bacilli are carried to the lining of the kidney by the lymphatic tubes. In this variety of tubercular kidney no other organ is involved except those of the urinary tract. Ofttimes the disease involves but one kidney, the other being healthy.

2. I should say no to each half of this question.

Case Is Incurable.—*New Subscriber writes: "I have a friend, 46 years old, weighing 200 pounds. He has a good appetite, can eat anything cooked for him. He has suffered from Bright's disease for seven or eight years. His doctor ordered him to take Epsom salts or cream of tartar every forenoon. He got tired of it and can't take it any more. He is constipated*

all the time and has pain in the head and frequently in the back of his neck. He is restless at night and finds it hard to get his breath at times. He is always dull and sleepy. Would you tell me if his case is incurable, or what would you suggest?"

REPLY.—If his Bright's disease has lasted seven or eight years, he is incurable. At the same time by intelligent care and watchfulness you may succeed in keeping him alive and fairly comfortable for several years. The symptoms stated in your letter do not indicate that he is doing well now. You must keep his bowels and skin working well. As he can no longer take what he has been taking, use something more simple. Find something the effect of which he will like.

Danger in Overeating.—*A. B. S. writes: "I weigh 220 pounds and am about 5 feet 8 inches in height. At times I feel dumpish, am heavy eater, and work inside, drink some and smoke. At times I think I am troubled with liver, then again I think it might be Bright's disease; have large puffs under my eyes at times. What do they indicate?"*

REPLY.—Puffs under the eyes may mean Bright's disease. Urinalysis repeated in case the first is negative will tell you. A heavy eater who works inside is certain to overtax his liver or his kidneys or both sooner or later. Why not reform now?

Use of the Kidneys.—*Constant Reader asks: "Why was the elaborate pumping machinery (the kidneys) put in the body, when, seemingly, all possible fluid is needed for flushing the colon?"*

REPLY.—If all of the water separated from the blood by the kidneys was excreted into the colon conditions would be intolerable. The average man would be better off if he had a few ounces of additional water in his colon, but the pints excreted by the kidney would overdo things. The human machine, as nature makes it, is a very good article. That it goes wrong when man tampers with the works does not argue that it should have been made different.

Stone in the Kidney.—*N. L. G. writes: "Can stone in the kidney be cured? My doctor tells me I have one, and suggests an operation. To avoid this, what would you advise?"*

REPLY.—Stone in the kidney cannot be cured, in the sense of removal of the stone, in any way except by surgical operation. Sometimes the symptoms disappear because the stone settles down quietly in a pouch or because an infection which accompanied the stone subsided. But the stone is there just the same. Follow your physician's advice.

Gravel in the Urine.—*M. A. C. writes: "1. What is the cause of gravel in the urine in a young woman 27 years old? She also has severe headaches by spells. 2. Is the gall-bladder working all right? She has to take pills all the time to move the bowels. 3. What kind of diet should she follow to help her? She has pain in the bladder for quite a while now."*

REPLY.—1. Gravel in the urine is precipitated urates. After normal urine has stood for a while in the cold it precipitates urates. Some call this gravel. This phenomenon indicates nothing. When urates precipitate while the urine is in the kidney or the bladder the condition is called gravel. That is of consequence. If that is the condition drink more water

—several times as much as you now drink—and go to your physician for counsel.

2. You do not give any symptoms referring to your gall-bladder.

3. Eat an abundance of fruit and vegetables. Eat bran bread. Drink plenty of water. Exercise in the open air.

Salt and Bright's Disease.—*P. writes: "An article by an M. D. in a recent issue of* The Cooking Club *on the salt eating habit stated that the use of salt in the human system is deleterious, producing diabetes, Bright's disease, and heart troubles. He protested against its use in cooking. Is there any considerable school opposed to the use of salt? What is your own view of meat eating, as opposed to a strictly vegetarian diet?"*

REPLY.—I do not think there is any considerable school opposed to the use of salt. In Bright's disease it is best to decrease the amount of salt taken with the food. Many physicians think so. My opinion is that a moderate amount of salt is a necessity. I believe in a mixed diet—one containing meat, bread, vegetables, and fruit. However, adults doing mental work require little meat. In summer little meat is required.

Concerning Floating Kidney.—*Subscriber writes: "Will you kindly answer the following: 1. What causes floating kidney in child of 14, not adolescent? 2. Will this interfere in any way with periods? 3. Can floating kidney cause intense pain in kidney region, nausea, weakness? 4. Is it advisable to use X-ray to determine cause of pain, if it is felt that the kidney is not causing all trouble? 5. Is not use of X-ray a bad idea? I know, of course, it has value, but are not the effects on the individual deleterious? Have heard prominent physician decry use of it and wish to know. 6. Is gymnastic dancing advisable for one who has had two severe attacks of appendicitis?"*

REPLY.—1. Probably she was born that way. The tissue that holds the kidney against the back sometimes is so arranged as to permit that organ to move about. Movable kidney may be due to accident, to pressure from a corset, or to loss of flesh.

2. No.

3. Yes. The displaced organ sometimes kinks the ureter, causing pain.

4. I don't think X-rays will give you any information. Physical examination and urinalysis ought to be satisfactory. If not, a catheter can be passed up the ureter to the kidney. It is possible that X-ray of the ureters with the catheters in them might help.

5. There are no bad effects unless there is a burn. Burns are exceedingly rare now.

6. Yes.

Osler on Floating Kidney.—*G. W. writes: "My daughter has been troubled with a floating kidney. Will you kindly advise whether an operation is necessary, and, if so, whether it is dangerous?"*

REPLY.—Sometimes floating kidney calls for an operation. The operation consists in fastening it to the back. Ninety-nine times out of one hundred it calls for nothing. Osler says people with floating kidney should never be told about it, since they thereupon commence having aches and pains, imaginary in character.

Dropsy.—*A. B. Z. writes: "1. What is the cause of dropsy? 2. Is there a permanent cure when a young person has had an attack where feet,*

hands, and face were swollen? 3. Should a person marry who has had an attack of dropsy? 4. Does it run in a family and can children inherit it?"

REPLY.—1. Dropsy may be due to any one of several causes, the most important being kidney disease, heart disease, and liver disease.

2. Probably, in the case suggested, the cause was kidney disease. Many such conditions pass away and there are no symptoms for years, sometimes never. The dropsy is a detail. The answer must depend on the condition of the kidneys.

3. If the kidneys get in good condition, yes. However, the person affected should be frank with the intended.

4. No.

Kidney "Dopes."—*K. M. S. writes: "I have been taking kidney dopes for several years, with no good results. I always have a full feeling in the top of my head and a ringing sensation in my ears for several hours every evening, also my hair persists in falling out steadily. I am not lazy, but I find it so hard to take the least interest in anything."*

REPLY.—Kidney dopes cannot possibly help you. If you have kidney disease, regulation of your life will help you, but kidney medicine certainly will not. You may have kidney disease. Find out through urinalysis. You may have profound anemia. Find out by blood examination.

Bright's and Diabetes.—*A. L. N. writes: "You state a warm climate, as in Tucson, San Antonio, and El Paso, is excellent for Bright's disease. Several specialists in this country claim there is no such thing as Bright's disease; that sugar sickness, called diabetes, is not a kidney disease. There must be some mistake. Diabetes, called sugar sickness, is certainly a kidney disease; it is not a stomach, liver, gall, or an intestinal malady. Diabetes at a certain age is fatal, no matter what climate or what remedies are used; but after a certain age patients keeping a prescribed diet can live an unlimited time. A few years ago a friend of mine suffering from diabetes visited Europe, consulting Professor Erd in Germany, a prominent specialist, who, after making an examination and telling him no medicine would be given, gave him a printed book informing him about his diet—what to eat and drink, and what not to eat and drink. In parting the professor told him that the cause of diabetes was unknown and that there is no cure for it. My wife had diabetes for about twenty-five years and lived strictly as to her diet, staying for many years at Waukesha drinking the water. She died here at 73. Still, a good deal depends upon the constitution and good care patients receive."*

REPLY.—The term "Bright's disease" is used loosely to designate inflammation of the kidneys. There are several different kinds of Bright's disease, due to several different causes. They vary greatly in their symptoms and in the rapidity of their progress.

Diabetes is a disease in which there is sugar in the urine. It may be due to brain or nerve disease, to disease of the pancreas, or to the eating of more starches than the body can burn up.

It is not a kidney disease. The kidneys are simply doing the best they can to rid the body of sugar. Sometimes the hard work causes the kidneys to break down under the strain, but that is secondary.

The disease is usually rapidly fatal in the young. In the old it is very mild. From the philosophical standpoint, it is about on a plane with obesity and is not much more serious.

CHAPTER XXXVII

Digestion

IMPORTANCE OF CHEWING FOOD

Digestion begins in the mouth. It is essential to know that when the food has been retained in the mouth long enough to become thoroughly incorporated with the mouth juices an important part of digestion has already taken place. When the food is well chewed it becomes well mixed with the saliva and other mouth juices and this is one of the reasons why complete mastication of the food is necessary.

Starch, for instance, is converted into sugar by the action of the saliva and this is one of the steps of digestion. If food be thrust into the stomach without being emulsified by chewing and the starchy substances of the diet converted into sugar before being swallowed the stomach is compelled to take on a duty for which it was not intended.

That the stomach can and does take on and perform the functions of the teeth and the mouth for years without complaint does not refute the argument in favor of chewing. It only indicates that the stomach is an organ of wonderful power and adaptability. It can and will for a time in addition to its other duties perform the function of the teeth and the mouth; but at last it gives out and the owner finds himself a victim of one of the forms of indigestion.

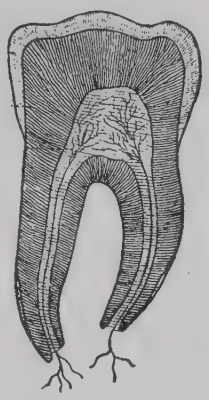


FIG. 221.—SECTION OF A TOOTH SHOWING ENAMEL, DENTIN AND PULP.

There are other reasons why thorough mastication is necessary. The longer the food is retained in the mouth and the longer it is chewed the more chance the taste nerves have to come in contact with it; and when the palate is satiated the appetite is appeased and the desire for food is gone. The same mouthful of food retained in the mouth sixty seconds will go nearly as far toward satisfying the taste nerves as two mouthfuls retained in the mouth thirty seconds each.

Hence it follows that thorough mastication of food is a preventive of overeating and it may be said that overeating is one of the dietary sins of the age.

The savory taste of food in addition to the motion of the jaws and cheeks facilitates the flow of saliva. It is necessary that the mouth juices be incorporated with the food while it is still in the mouth.

All chewing of gum or other substances between meals creates an undue

flow of saliva at a time when the salivary glands should be at rest. The result is a shortage of that necessary fluid when the next meal time arrives.

PROCESS OF DIGESTION

A man from whom the entire stomach has been removed can digest lean meat. The digestive and assimilative apparatus can convert lean meat into sugar. It can convert lean meat into fat. But muscle cannot be made from sugar and starch foods or from fatty food.

When proteids whether from animal or vegetable sources are eaten digestion begins in the stomach. The mouth breaks the food up and the saliva moistens it; but it is not until the gastric juice strikes it that digestion begins.

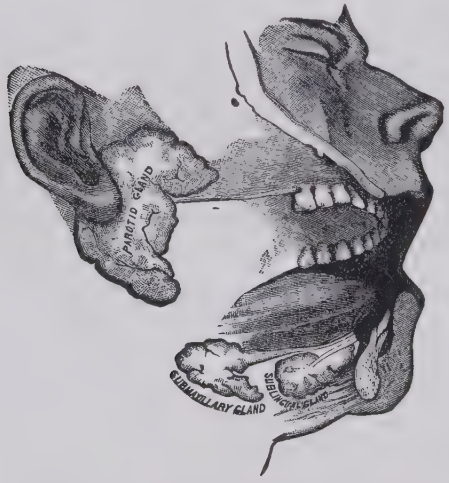


Fig. 222.—The Three Salivary Glands.

The stomach is powerful as a mechanical mixer. Its juice converts proteids into acid albumin or syntonin, then into proteose; then some of it is changed to peptone. Then the mixture of syntonin, proteose and peptone is passed into the small intestine. The pancreatic juice changes the syntonin and proteose to peptones. This action is so powerful that it has been found that the pancreas can wholly take the place and digest lean meat in a person who has no stomach.

We have known for a long time that the stomach was not so important as it was thought to be in olden times. Its most important function is its gizzard function—its work as a mixing machine. Most people who think they have dyspepsia and stomach trouble have something else.

The intestinal juice converts the peptones into amino acids. Now the work of digestion of albumin has been completed. The next step is absorption.

The amino acids are absorbed from the intestines and pass into the blood bound for the liver. They are carried from the liver to the different portions of the body.

The different cells of the body in need of material for repair pick up what amino acid they need and use it to replace the tissue that has been worn out.

The worn out tissue is changed into an amino body whereupon it dissolves, enters the blood stream, travels to the liver and from there to the organs of excretion, principally the kidneys.

On the way it is converted first into ammonia and then into urea. The conversion occurs in the blood and somewhat in the body cells. The con-

version of the ammonia into urea occurs in the liver. The filtration of the urea from the blood occurs in the kidney.

This is what happens in the body of the cell. Every cell has a nucleus —the small directing head for the cell body. When the aminoacids replace the waste in the nucleus ferments convert the waste through several steps to form uric acid.

This uric acid is carried by the blood to the muscles, the liver and the kidneys. A good part of it is burned up, destroyed by the muscles and the liver.

The part not destroyed by these structures reaches the kidneys which filter it out of the blood. In the urine it may exist as uric acid or urates or substances closely related to uric acid.

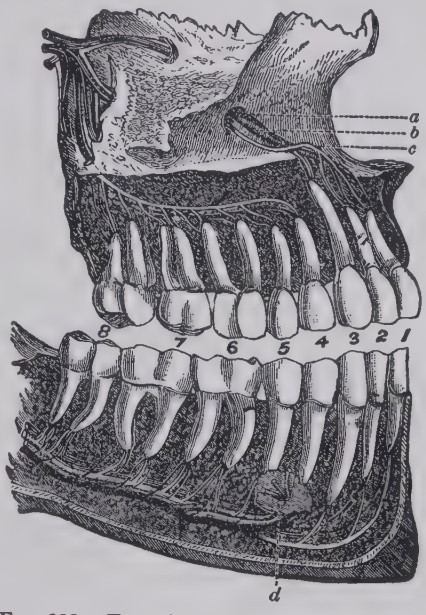


FIG. 223.—THE JAWS AND THE TEETH. 1, 2, incisors; 3, canines; 4, 5, bicuspids; 6, 7, 8, molars; *a*, vein; *b*, artery; *c*, nerve; *d*, vein, artery, and nerve.

DIGESTIVE TROUBLES

If one is afflicted with pain in the stomach, distention, belching or gas, colicky pains, sour stomach, so-called heartburn, or like maladies, the cause is usually some form of indigestion and is due to improper feeding.

Few of these symptoms occur in the underfed but all of them may occur in those who are overfed. Too much food for one person may not be too much for some other person, as digestion is wholly an individual affair. It naturally follows that a food that has helped or harmed one individual may not so affect his neighbor.

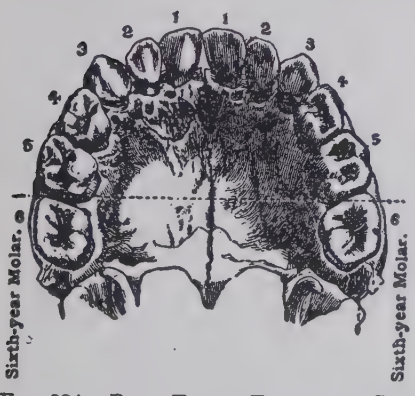


FIG. 224.—BABY TEETH, EXCEPT THE SIX-YEAR MOLARS. The six-year molars belong to the permanent teeth

It is irrational to be careless in eating or to eat too much and then to take medicine or spirits to aid digestion. If a food cannot be digested without artificial aid it should not be eaten at all, or if eaten the quantity should be small enough to be within the digestive power of the diner.

Some persons have lived to old age without any appreciable illness from indigestion; but they were persons of equable temperament, were robust to start with and practiced few indiscretions in eating or otherwise.

Such instances are extremely rare, for most persons have more or less

trouble some time in their lives and very many have digestive troubles all their lives. Many ailments have their origin in faulty nutrition. Indeed, physicians know that most of those who consult them have no organic disease but suffer from the evil effects of errors of diet, overwork or bad habits of life.

Different kinds of food produce different kinds of trouble but the first requisite bearing upon relief is to reduce the total quantity of food taken while the trouble lasts and to endeavor to determine the kind of food and the quantity that can be best borne with freedom from discomfort.

Those suffering from a feeling of distention and the eructation of gas may have excessive fermentation in the digestive process. As sugar is the chief factor in fermentation it should be discarded or the quantity greatly reduced. As bread, potatoes and beans are rich in starch and the mouth and stomach juices convert starch into sugar they should be eaten sparingly. But most of the gas belched has been swallowed as air.

EXERCISE AND THE STOMACH

The stomach muscles move in waves somewhat similar to those of the heart muscle. When the muscle is contracted down we call the stage systole. When the muscle is relaxed the stage is called diastole. Exactly these same terms are used for the movement of heart muscle. The muscular contraction starts when the food enters the part of the stomach called the cardiac end and moves toward the end where the food leaves the stomach called the pyloric end.

Each muscular contraction is called a cycle. A cycle takes three seconds. In other words we might say that the stomach beats twenty times a minute. The heart beats about four times as fast.

Sometimes a wave travels from one end of the stomach to the other. More frequently it travels a quarter way, then breaks, then starts up, travels another quarter, then breaks and so on until it gets to the emptying end.

Now, during all of this churning chemical action is taking place. The point is that the churning is more important than the chemical action. When the mixed food has been pushed into the first part of the small intestine the chemical work can and does keep up but if the churning has not accomplished its part of the work it will not be done. As a large part of the chemical work of the stomach is done outside of the stomach the muscular work must be done in the stomach and by the stomach.

These few facts lay the foundation for some highly important practical conclusions. The diagnosis of cancer of the stomach is difficult. Operations based on the old symptoms such as tumors, hemorrhage, rapid emaciation and chemical tests do no good. A test suggested by Abderhalden is being tried out. It may prove able to demonstrate cancer of the stomach in the early stages. Let us hope.

X-ray examination of the bismuth-lined stomach shows cancer at an earlier stage than did the old methods.

The second is this: When the digestion is poor the most important

thing to do is to build up the stomach's muscle. When one builds up his general muscular tone he builds up his heart muscle tone and his stomach muscle tone.

Exercise in the open air well planned and persistently carried out is better for dyspepsia than pepsin or soda or tablets or several of these combined.

In one of Dr. Cole's articles on the radiographic examination of the stomach he says:

"The gastric cycle is governed somewhat by respiration through the vagus, which supplies impulse both to the diaphragm and to the stomach. This suggests a method by which gastric peristalsis may be stimulated."

An extremely important nerve called the pneumogastric or vagus runs down the neck into the chest to the abdomen. It stimulates the lungs to do their work and the stomach to do its work. The stomach, lungs and heart being hooked on the same wire, what affects one may have some effect on the others.

The exercise that causes one to breathe well stimulates the stomach to work well. Perhaps the old fellows who sniffed snuff were wiser than those who took pepsin.

To give the statements "punch" let us summarize as follows:

1. The most important work of the stomach is that done by its muscle.

2. Muscle exercise which builds up the general muscle system prevents and cures dyspepsia by improving the tone of the stomach muscle.

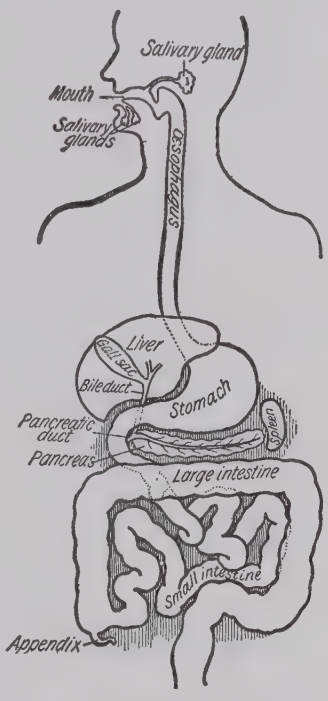


Fig. 225.—Diagram Illustrating Digestive Organs.

3. Since the same nerve which supplies the stomach muscle supplies the heart and lungs anything which stimulates breathing and heart function stimulates the stomach.

4. An X-ray study of the stomach movements is about the best method for diagnosing early stage stomach cancer now known.

DIETING FOR FERMENTATION

Many people complain of intestinal fermentation. Dr. Ashford of Porto Rico gives three methods of dieting to overcome this trouble.

1. Stop all food except milk for a period of forty days. Take eight ounces of milk every two hours for four days. Nine feedings a day should be taken. The milk should be consumed cold. It should be slowly sucked through a straw. A half tube of Bulgarian lactic bacillus from a good manufacturer should be added to each feeding just before taking. On the fifth day and for three days thereafter take nine ounces at a feeding. On

the ninth day take ten ounces. Increase the feeding one ounce every fourth day until thirteen ounces constitute the size of the meal. When thirteen ounces as a portion has been taken for four days reduce the dose of milk to twelve ounces nine times a day and add one banana a day. After four days of this reduce the dose of milk to eleven ounces nine times a day and eat two bananas a day. From this point on gradually decrease the milk, indulging instead in eggs, fruits, and vegetables. Avoid potatoes, beans, apples and underripe fruit.

2. Stop all the usual foods for one week. Take two pounds of chopped or roasted meat a day. Divide it into six feedings. The meals are to be taken at three hour intervals. Few people can stand this diet for more than a week. After the expiration of the week reduce the amount of meat and add vegetables, fruit and eggs.

3. Take a simple fruit diet in which bananas form the principal in-

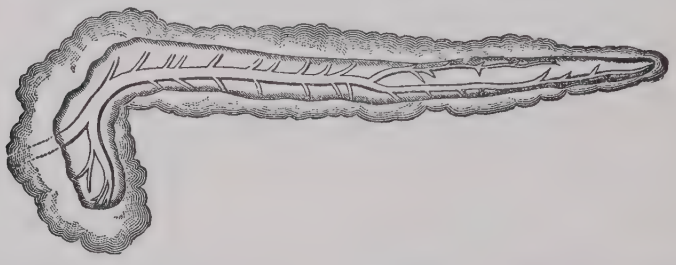


FIG. 226.—THE PANCREAS, PARTLY CUT AWAY, SO AS TO SHOW THE DUCT WHICH COLLECTS THE PANCREATIC JUICE AND EMPTIES IT INTO THE DUODENUM.

gredient. The fruits must be fully ripe. Apples and fruit containing a good deal of starch should be avoided.

Dr. Ashford's advice relates particularly to intestinal fermentation in a form of tropical disease called sprue. This disease, he thinks, is due to a yeast-like body belonging to the monilia. Monilia is liable to grow in yeast as a contamination. When bread is made with yeast containing monilia the mold may not be killed by the heat. Ashford thinks that this mold carried into the intestines by bread is the cause of sprue.

By withdrawing bread, potatoes, sugars and sweets wholly from the diet for from one to six weeks he starves out the molds in the digestive tract. Of course care must be taken with bread and potatoes thereafter, else the disease will return.

People in this country are not interested in sprue but thousands of them are interested in intestinal fermentation. The custom is to take charcoal or soda every day and a purge about every so often.

The plan above outlined should help these cases. They will not stay cured if they go back to a diet rich in bread, beer, potatoes, apples, pastries, cakes and desserts.

SUGAR EATING

Dr. Kuhnert offers some suggestions to the German people for improving their chances in the Great War. He advises them to cut their acreage

of beets in half. The land released from beets is to be devoted to grain. Before the war the German law required that the flour mills grind 70 per cent of the wheat berry into the flour. At present the requirement is that 82 per cent shall go into flour. This requirement prevents waste and, what is more important, it increases the protein and the mineral matter in the flour.

Dr. Kuhnert advises that all of the berry go into the flour, that none of the bran be discarded.

Now for a most subtle suggestion. He advises that the Germans export as much beet sugar to England as possible. The *Chicago Medical Recorder* quotes him as saying that by fairly flooding the English people with sugar their vitality would be lessened, the plain inference being that they would thus become less powerful opponents of the Germans.

The basis of this novel proposal is as follows: Sugar is absorbed by the digestive apparatus without having to be changed. It is burned quickly into energy and heat. People in need of a great deal of heat and energy can get it by eating sugars and sweets. Men exposed to great cold, children playing very hard and men leading very active lives can get what they need of attractive flavors in convenient form and in a generally satisfactory way by using chocolate, candies, sugars and sweets.

However, let us not forget that alcohol in moderate doses furnishes heat and energy quickly and effectively. Yet the disadvantages of alcohol far outweigh its advantages. Sugar has not the poisonous effects of alcohol but it has some of its other disadvantages. It is a one-sided diet. It satiates the appetite without furnishing the proteins and the minerals needed for a good physical development. People who eat much sugar are fat and flabby.

The eating of sugar requires no work by the digestive organs. Therefore, the digestive organs of heavy sugar eaters are apt to balk at digesting meat, bread and vegetables. Sugar eaters generally have no particular appetite for heavier, coarser foods.

Dr. Beck says that sugar eating children get very hungry, are quickly satisfied with a little food and in a short while are very hungry again.

Finally, sugar eaters develop a lot of lactic acid in their tissues. To neutralize this lime is absorbed from other tissues. In consequence sugar eaters have poor teeth. Sometimes in the case of children they develop rickets—they are fat but soft.

Dr. Kuhnert would give the German soldiers sugars, chocolates and sweets whenever they are very tired or very cold. But for a steady ration—no. On the other hand, he would advise flooding England with German beet sugar with a view to promoting its daily use by the British soldier and by the people at home.

Indigestion the Cause.—*H. W. writes that he has an irregular pulse, especially at night. Physicians have failed to find any organic heart disease. He takes strychnin tablets or digitalis as a stimulant frequently. He wishes to know if an irregular pulse is dangerous and if the taking of strychnin and digitalis is harmful. He takes a half teaspoonful of carbonate of soda each evening and has done so for two years, and wishes to know if this is doing harm.*

REPLY.—Functional heart trouble resulting in an irregular pulse suggests the need of proper medical care. The heart can be as much a source

of danger by reason of disturbance of its nervous mechanism as it can be from leaky valves.

It appears that H. W. has indigestion which he patches up with soda; that the indigestion causes a disturbance of the heart on its nerve side and this he patches up with digitalis.

No man is justified in continuing the use of a half teaspoonful of soda for two years. He should change his eating habits and get at the reason for his stomach disturbance rather than use soda. His use of digitalis is also to be condemned.

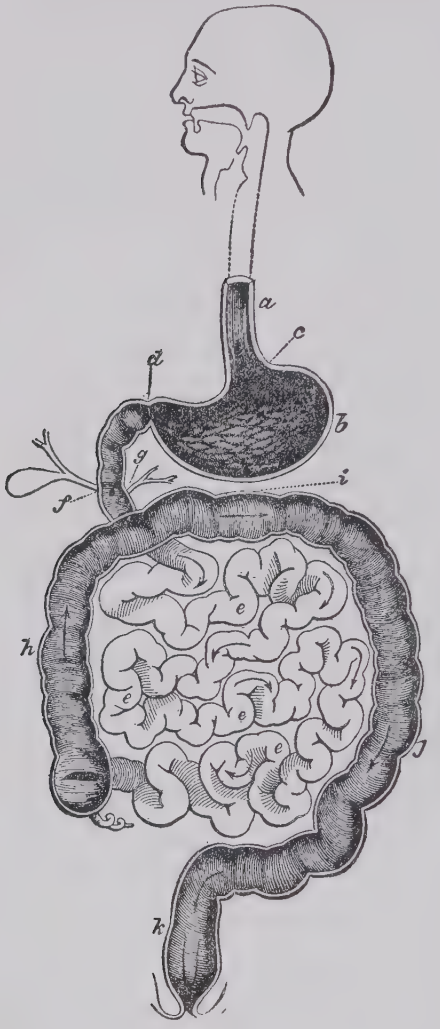


FIG. 227.—DIGESTIVE APPARATUS. *a*, esophagus; *b*, stomach; *c*, cardiae orifice; *d*, pylorus; *e*, small intestine; *f*, biliary duct and gall-bladder; *g*, pancreatic duct; *h*, *i*, *j*, *k*, large intestine; *h*, ascending colon; *i*, transverse colon; *j*, descending colon; *k*, rectum. At junction of *e* and *h* is ileocecal valve, below which is vermiform appendix.

Nerves of Taste.—*A. T. D. writes: "1. Why does the temperature of any article taken into the mouth affect the sense of taste? 2. Will not the taste discover where the chemist will fail? 3. Is it not possible to get an infection through eating or drinking something that is very cold, and if taken at a warmer temperature are not the chances minimized by the sense of taste in discovering the infection? 4. What is the construction of the tongue and palate?"*

REPLY.—1. The endings of the nerves of taste are delicate. If a substance is hot or cold the temperature will numb the nerve endings. If the temperature is within the limit of this numbing effect of temperature will be on the substance tasted. Most substances dissolve better in warm water. Taste will be more acute if the solution is a little warm. If the substance gives off an aroma when warm the nerves of smell aid the nerves of taste.

2. No. I think without exception for each substance there is a chemical test more reliable and more trustworthy than a taste test.

3. No. Taste is of no service in guarding against poisoning. For instance, many food poisons do not change the taste of the food in which they have developed.

4. Taste lies in the tongue. The palate has no taste nerves. The taste

nerves end in delicate bulbs. These little bulbs contain nerve endings sensitized so as to be irritated by substances in solution having tastes. These nerve endings are not capable of appreciating slight changes in temperature or touch and they are not capable of registering pain.

Eat Bulkier Food.—*C. K. writes: "What can a woman of 75 do whose head is one mass of acute neuralgia, who works more than she ought to, and patches more quilts than is necessary, but cannot be made to shake off work habit? Ordinary relief, as she understands it, does not suffice. What about the sand cure? Will one-half a teaspoonful a day of sterilized sand be beneficial to the average person? How and upon what organs does it act, and is there liable to be damage resulting from continued use? How often would it be advantageous to use it?"*

REPLY.—As I have frequently written the cure for ordinary cases of constipation is to eat bulkier food, particularly food containing a good deal of roughening. I especially advise wheat, bran, unbolted corn meal, breakfast foods which contain a good deal of bran or fiber, the stringy, fibrous parts of meat, the peelings of apples, pears, peaches and apricots and the hulls and seeds of grapes.

The receipt of this letter and several others indicates that the use of sand for constipation is somewhat widespread. The first thought is that it would be liable to cause intestinal stones. Yet intestinal stones are rare, harm from them is so much rarer and we eat so much dirt with our food and drink so much with our water that the danger cannot amount to much. If sand is used it should be free from clay and ordinary dirt. Possibly it is best to bake it to make it sterile.

Even though we are careless about eating bacteria in milk it is just as well to be careful about eating them in sand. It is probably better to use peelings, bran and hulls than to use sand. But sand is better than purgatives, oils, salts or ordinary constipation cures.

Breath of Dyspeptic.—*W. E. H. writes: "Is there anything known that will neutralize, deodorize or alleviate the breath of a chronic dyspeptic? Mr. Howells, in a novel, alludes to the dyspeptic's breath in New England, which might mean that it is hopeless; but is it entirely so?"*

REPLY.—The odor when not from the nose and throat is due to intestinal putrefaction and the absorption into the blood of the gases that result. The blood throws these gases into the air in the lungs. Nothing neutralizes or deodorizes these gases.

To cure constipation and to prevent putrefaction use a diet composed in large part of cheese, milk, buttermilk and sour milk.

Dr. Hawk of the University of Illinois in conjunction with several of his colleagues has written a series of papers on water drinking. Among other conclusions he says that drinking one pint to one quart of water with each meal will decrease intestinal putrefaction and afford "many other desirable and no undesirable features."

Cut Down Starches.—*W. I. J. writes: "What is the meaning of 'intestinal indigestion'? Am I right in understanding that all starchy foods are digested in the small intestine? If so, isn't it best to eliminate such food from the diet of one who is afflicted in that way? Kindly give me the diet one should follow with this complaint. Is it curable? Is it the cause of weak heart action, poor circulation, and cramps in the feet, as well as the hands going 'to sleep' when in a lying position? What is your idea of fruit eating under such conditions? Is deep breathing of any material benefit?"*

Reply.—"Intestinal indigestion" is a rather loose term, which most people use as meaning intestinal fermentation, and some as meaning what used to be termed "biliousness." Some of it occurs in the small intestine and some of it in the large. Starch digestion starts in the mouth and keeps up under one kind of a change or another until the starch is used for energy. The work which the stomach does in digesting it is not of great importance.

If there is excessive fermentation it is an indication to cut in half bread, potatoes, cereals, sugar and other starches and to increase meat and fats enough to compensate.

Fruit eating is always advised. So is deep breathing.

Intestines overdistended with gas can give a train of nervous symptoms such as "weak heart," "poor circulation," "cramps," "hands going to sleep," and the like.

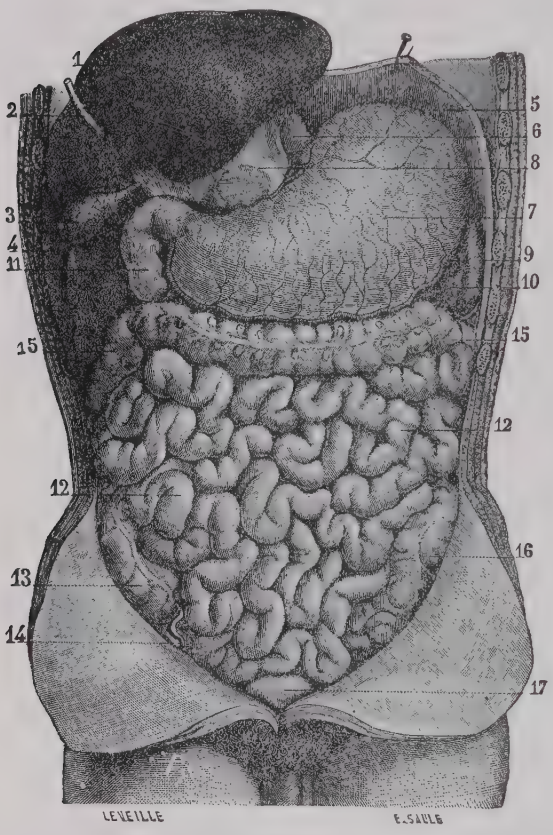


Fig. 228.—Position of Abdominal Contents. (1, 2, 4), Liver; (3), Gall-bladder; (7), Stomach; (12), Small Intestines; (13, 16), Large Intestines; (14), Appendix; (9), Spleen.

Sugar.—*O. C. B. writes: "In your article, 'To Live During a Ripe Old Age,' you speak of the 'lactic bacilli' of buttermilk finding in the digestive tube the 'sugary material' required for their subsistence. In a recent newspaper item Professor Metchnikoff is said to have discovered that the poisons which produce old age are 'nullified by sugar' and a 'bacillus living in the human intestines.' But my doctor warns me against the use of sugar, saying it clogs the liver and harms the kidneys. (1) What is the truth about the use of sugar? And what about the lactic bacilli that live on 'sugar' and 'sugary material'? I have been using buttermilk for months, and find it a great deterrent of putrefaction. (2) In the use of sugar, which is the more healthful, the brown or the refined white?"*

Reply.—1. Sugar is an excellent fuel and energy producer. It is all right to use it in moderation but used beyond the capacity of the liver to convert it it brings about glycosuria—or a variety of diabetes.

2. There is no difference from the health standpoint.

Indigestion.—*L. L. L. writes: "At times I have a heavy pressing feeling just to the left of my heart. A doctor told me it was indigestion and gave me some drops, but it does not seem to cure me. It makes me feel nervous at times. Is it dangerous? Can it be cured? What is good food to make one gain flesh?"*

REPLY.—Don't try to cure indigestion with drops. The cure for indigestion is freedom from worry, mental calm, proper bowel habits, eating small meals well chewed, never overeating and plenty of exercise in the open air. Indigestion is not dangerous. Simple indigestion can be cured. To put on flesh stop worrying. Drink milk and eat cheese and bread.

Catarrh of Stomach.—*C. O. D. writes: "What state or locality would be the most helpful to one suffering from nasal and stomach catarrh? Is there any relation between nasal catarrh and catarrh of the stomach, and are climatic conditions a factor in catarrh of the stomach? Are gastritis and catarrh of the stomach the same?"*

REPLY.—1. Climate makes no great difference.

2. No.

3. One form of gastritis is sometimes called catarrh of the stomach. If the term catarrh were abandoned we should get ahead faster. It is loosely used to cover a lot of conditions. The treatment for so-called nasal catarrh is to have the particular disease diagnosed and then treated properly. The treatment of catarrh of the stomach is to overcome constipation, do physical work in the open air, quit worrying and pay a decent regard to what is eaten and how it is eaten.

Intestinal Indigestion.—*M. J. M. writes: "Will you kindly tell me what kind of food and drink it is best to give one who is troubled with intestinal indigestion?"*

REPLY.—It is difficult to answer your question because it is not certain what you term "intestinal indigestion." Most of the conditions called intestinal indigestion are food fermentations or putrefactions. Many of these cases are the old condition called biliousness.

Now, to call them intestinal indigestion is getting somewhat nearer the truth than biliousness but the cases require much closer analysis.

Suppose you decrease the amount of your food, increase your eating time to three times what it now is and chew much more thoroughly.

If this does not give you relief you should have your condition studied individually and find out just what your indigestion is and change your habits accordingly.

Meaning of Proteid.—*J. B. writes: "What is the meaning of proteid? What is it obtained from? What is its use in the practice of medicine?"*

REPLY.—Proteid is albumin. There are different kinds of albumins, so the term proteid is commonly used as standing for the group. We say that milk is composed of water, fat (meaning cream), carbohydrates (meaning milk sugar), proteid (meaning the albumins or curd part of the milk) and salts.

We say that meat contains 20 per cent. proteid, meaning that if a pound of meat is eaten the person eating gets one-fifth of a pound of albumin. Proteids are food. It is that food element which is especially needed for growing children and adults doing physical labor.

Salt Meat Diet.—*W. J. T. writes: "Do salt meats as a diet allow blood to become impoverished and produce a bad complexion when the digestion is good? Would you advise a fresh and salt meat diet for an overstout person of middle age, whose bowels and circulation are sluggish?"*

REPLY.—Salt meat in ordinary quantities and not as an exclusive diet will cause no harm. Too much salt meat and no green vegetables causes scurvy. Salt or fresh meat as such has no particular effect on the bowels. Eat salt or fresh meat but add plenty of roughening.

Exercise More; Eat Less.—*A. B. writes: "Kindly advise me as to the proper treatment for a bad liver. I have been affected for five years with what seems to be sluggish action of that organ. At times I become dejected, dissatisfied with everything, including my food, and know that in a few days I will have an attack of biliousness. It usually takes two or three days then to get straightened up again, and for a time afterwards I will be myself. A jaundice-like complexion and a desire for use of stimulants and food to excess always accompany, or rather precede, these attacks. Although I do not get much exercise, I take good care of myself, except at these times, and my bowels always move regularly."*

REPLY.—Your attacks are a modified migraine or a gouty manifestation. Although you are not constipated a saline purge will straighten you out. The only permanent cure is to exercise more and eat less.

Don't Eat Apples.—*E. F. G. writes: "Is there anything I can do to overcome acid in stomach from eating apples? I am very fond of them and they are almost a necessity to me, but if I eat three or four a day they put my stomach on edge."*

REPLY.—If eating apples sets your stomach on edge don't eat them. They are doing you more harm than good.

Onions and Health.—*J. and K. write: "We ask you to please enlighten us about the nutritive qualities (if any) of the onion. A says it is one of the most healthful of foods, eaten either raw or cooked. He bases his theory on tradition, and because so many well and healthy people eat onions. He says they are conducive to sleep. B says they are indigestible because they are belched back hours after having been eaten and their odor is too strong."*

REPLY.—Onions have little food value. It is well to eat them in winter for the same reason that we eat other vegetables and fruits of low food value—for example, turnips, beets, celery, radishes, and oranges. It is not because the odor is bad that onions are healthy. On the other hand the fact that the taste and odor are appreciated when one belches does not prove that they are hard to digest. Any strong odored food such as onions or coffee flavors the gas belched. Odorless foods do not thus reveal themselves. That is all there is to it.

Ptomain Poisoning Protection.—*Mrs. T. N. writes: "Will you please advise what precautions should be taken in using canned goods to prevent ptomain poison? Would thorough heating make food safe? What home medicine could one take if ptomain poisoning exists?"*

REPLY.—1. Patronize reliable grocers. Select cans that are fresh looking, unrusted and not swollen and that have but one soldered puncture hole.

I am informed that two holes are always present in a salmon can. See that the food when emptied from the can tastes, smells and looks right.

2. Some food poisons are destroyed by thorough heating. Some are not. The risk is decreased more than half.

3. Produce vomiting by tickling the throat. Hot mustard water produces vomiting. Produce purging with salines. If there is much shock use blankets and hot water bottles.

Unfortunately many of the food poisons develop without any change in the taste, odor or appearance of the food. Inspection at the source, dating and care in selecting one's grocer are about the only safeguards against the tasteless poisons.

Appendicitis.—*A reader writes: "1. What articles of food should be rejected by a young adult afflicted with chronic appendicitis and also chronic constipation? 2. Should fruit be peeled, and are beans harmful? 3. Is there any help in such a case outside of surgery?"*

REPLY.—1. None.

2. Fruit should not be peeled except bananas, oranges, pineapples and others with highly objectionable peeling. Grapes, apples, peaches, plums and prunes should be eaten peeling and all. Beans are not harmful.

3. Chronic constipation can usually be relieved by eating bulkier food and drinking more water. Nothing heals chronic appendicitis much except operation. Some cases get well spontaneously. Prevention of constipation is of some service.

How to Cure Heartburn.—*Violet writes: "Will you kindly advise me what to do for severe heartburn and belching immediately after eating? I have been troubled with it for ten years."*

REPLY.—Belching immediately after eating is a manifestation of nervousness. Nerves are also a potent cause of heartburn. Another important cause is bad eating habits. In view of all this, it will be seen that the remedy lies more along hygienic than medicinal lines. You might:

1. Cure constipation.
2. Eat slowly.
3. Put your teeth in order and keep your mouth clean.
4. Eat lightly; never gorge.
5. Drink a glass of water one hour after each meal.
6. Eat simple foods.
7. Avoid those foods the eating of which is followed by heartburn.
8. Exercise in the open air.
9. Keep your nerves in hand.

Take Cheese and Milk.—*J. F. P. writes: "Will you kindly set forth how intestinal putrefaction may be overcome? I presume flatulency is an evidence of this condition. Is it possible for stomach eructations to come from this cause?"*

REPLY.—Live on a diet of cheese and milk. Get the Department of Agriculture bulletin on cheese. Indeed, write your congressman to send you the diet series of bulletins.

Eructations of gas are due in the main to nervousness. It is a frequent semi-hysteric manifestation in men and women.

Pork Must Be Cooked.—*H. W. W. writes: "Does the process of curing and smoking hams and sides make ham and bacon good, clean, healthful food, the equal of No. 1 beef?"*

Reply.—The curing and smoking of hams and sides makes the meat good for eating after it has been cooked but not before. It has been demonstrated that smoking does not kill trichina or bacteria.

Drink More Water.—*J. J. writes: "1. What is intestinal indigestion? I have had it for eight months. Is there any cure for it? 2. The amount of urine passed each twenty-four hours is thirty-two ounces. Does that indicate anything serious? My bowels will only move when I eat bran bread."*

Reply.—1. What is called intestinal indigestion is generally fermentation of the food in the intestines. Three hours after eating the food has got out of the stomach. Its further adventures take place in the intestine where it lies for purposes of digestion and absorption for forty-five hours. Many people get rid of intestinal indigestion by a milk, cheese, vegetable and fruit diet persisted in for some time.

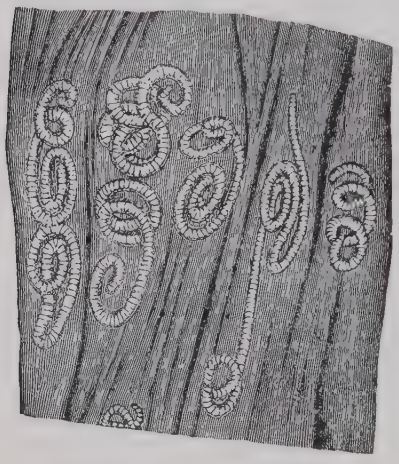


Fig. 229.—Trichina in Muscle.

2. It does not mean anything serious. It does throw light on your indigestion. If you will drink twice as much water as you have been doing you will be better off. Don't economize on water.

Buckwheat Cakes.—*Mrs. H. F. R. writes: "1. What is the nutritive value of buckwheat cakes? 2. What is the difference between graham flour and whole wheat flour? 3. Are pickles and spices such as cloves, allspice, and others harmful or beneficial to the system?"*

Reply.—1. About the same as corn or flour cakes. They furnish heat and energy especially. Eating them can be too long persisted in.

2. Wiley defines graham flour as unbolted wheat meal and whole wheat flour, improperly so called, as fine wheat meal from which some of the bran has been removed.

3. A moderate amount of pickle is beneficial, especially in winter. In summer fresh vegetables and fruits are abundant enough to supplant pickles. Spices, such as cloves, allspice and the like, I think do more harm than good.

Eat Three Meals.—*C. M. C. writes: "Is it not better for a man of 50 in normal health and weighing 200 pounds or more to continue eating three meals a day rather than omit luncheon for fear of becoming too fat? He is a man of business and actively engaged."*

Reply.—Yes, three meals a day are better than two. The aim should be to decrease the amount of food taken. This can be more easily done where several small meals are eaten rather than two large ones.

California Raisins.—*V. F. N. writes: "Please advise me if it is well for a person in good health who craves the large California raisin to eat half a pound after dinner four or five times a week."*

REPLY.—The article is all right. The quantity is large, especially for anyone who takes in other food anything like the usual quantities of starch and sugar.

Cuts Out a Meal.—*C. E. E. writes: "From time to time you are asked how to reduce weight, and recently you answered one person who asked you to outline certain food for that purpose. You said that what was good for one might not be for another. I speak from personal knowledge when I say that it is not the kind of food but the quantity that does the business. Here is the history of my own case. On December 31, 1911, I weighed 196 pounds. I am 5 feet 6 inches tall. This weight I knew was wrong, and I determined to reduce my weight to a reasonable basis. I also decided that the less food I ate the less my weight would be. This was the hard way, but it proved to be the right one. I cut out lunch. Then I ate less at breakfast and dinner than before, and for a time walked five to ten miles a day. It took some time to start to a lower weight, but in six months I was down to 165. I wrote you, giving reduced weight and diet. You advised me to eat more so as to slightly increase my weight because I had reduced too rapidly, with the suggestion that later on, if I wished to do so, I could start again. I was surprised to find that it was harder to start uphill than it was down, for I had to double my ration and it was two to three weeks before I could gain any at all. I went to about 170; then reduced the amount of food, and held at that for some time. Later I got to eating more at each of the two meals, and different food. I went to 185. Then I reduced the amount, but used the same food and lowered to 162. Now with a different diet but eating more I am at 174. This proves that if you eat more, regardless of the particular food, you will gain and likewise will reduce with the lessened amount. In fact, the way to reduce weight, and in my opinion the only way, is the hardest of all ways: Eat less in quantity and eat fewer meals."*

REPLY.—I think the average man will find it easier to distribute his food into three or four meals rather than two.

Effects of Gum-Chewing.—*W. S. writes: "What are the good and bad effects of chewing gum? Is oil of cinnamon injurious to the stomach?"*

REPLY.—1. To chew gum after a meal aids digestion. Most people do not chew their food long enough to mix saliva with it thoroughly. The chewing of gum adds some saliva to the stomach contents. It is of more service in stimulating the stomach muscle. It is especially serviceable in helping the stomach to empty its contents. If one has overeaten and the stomach is heavy something is gained by chewing gum for half an hour, beginning two hours after eating. It helps to settle the stomach in a "katzenjammer." So much for its good effects.

Gum does harm when continuously and everlastingly chewed. If saliva is poured into the stomach all the time, if the stomach muscle is continuously stimulated to work the digestion will be harmed.

2. Oil of cinnamon has a powerful effect on the stomach. Wisely used it will help; unwisely used it will harm. By this I mean when used in medicinal doses—more than a drop. The little used to flavor gum will make no difference one way or the other.

Bicarbonate of Soda's Use.—*Mrs. C. B. says: "In a recent* TRIBUNE *article you said that bicarbonate of soda was not harmful if taken occasionally. I am obliged to take a teaspoonful about five times a week after dinner, even though I am fairly careful with my diet, certain combinations of food sometimes unexpectedly causing the heartburn for which I take the soda. Will you kindly inform me if you think five times a week will be injurious?"*

REPLY.—Five times a week is too frequently. You should have your digestion investigated. Change your diet.

Sour Stomach.—*M. M. writes: "Should a person who has been troubled more or less with a sour stomach leave cereals alone? Often, no matter how simple the meal, the food will sour before she leaves the table. Sometimes hours later it seems to sour. She is 56 years of age and seemingly, except for this disturbance, is in perfect health. She is careful in her diet. Her breakfast of grapefruit, breakfast food, bran bread, and cereal coffee often causes as much trouble as a heavy meal. Digestion seems slow. She cannot eat anything of a lunch and then eat dinner at the usual hour. Of late a mouthful of sour liquid comes up sometimes a few moments after the meal. She occasionally consults a physician. He gives her a few pellets, which do not seem to give any permanent relief."*

REPLY.—1. No. Fruit acids such as enter into ordinary foods are not related to the acid which causes acidity.

2. My guess is that she had a dilated, and perhaps also a displaced, stomach but this is a guess and maybe wide of the mark. Have her go to see a physician who will examine her thoroughly and then advise. Advice as to hygiene is of first importance. A physician who superficially considers the condition and gives a few pellets cannot help.

The Disease of "Bad Habits."—*B. S. writes: "I am a man 65 years old, good habits, fair appetite, sleep fairly well, but yawn continuously during waking hours, feel tired, no ambition. Constipated badly for twenty years, take Epsom salts every day before breakfast. Friends suggest my trouble is kidney trouble. Tired always on arising. What is your advice?"*

REPLY.—Your case is easy. Your disease is bad habits and that is a bad disease. It is worse because you don't know you have it. When one is tired on arising it is because he has slept too much. Yawning continuously means that you do not move about actively enough or fast enough in the open air. Constipation means that you do not eat the right foods nor drink enough water. Taking Epsom salts before breakfast is the worst habit in the bunch of bad habits.

BELCHING

Belching is a sign of hysteria, neurasthenia or some other kind of a "jimmy." Furthermore, it is a habit and a bad one. It belongs in the class with stammering in that one learns how to do wrong when doing right is easier.

It is true a little gas may form from decomposing food in the stomach but the quantity will be small. A little gas may find its way from the intes-

tines into the stomach but the gas inflated areas of the intestines are some inches away and the direction of flow is away from the stomach.

Practically all the gas belched is first swallowed as gas. We swallow some air when we eat hastily. We swallow gas with carbonated water, when we chew and in many different ways. The profuse belchers, however, deliberately swallow air and then quickly belch it up.

If you will watch the Adam's apple of a person drinking water you will notice a certain characteristic swallowing motion. Now notice the Adam's apple of a belcher in action and you will see that he first swallows the air and then belches it. Physicians demonstrate it more plainly by watching the Adam's apple with X-rays.

How is the habit acquired? A person overeats. In his distended stomach there is a good deal of air. He belches and gets relief. Recollection of this remains with him in his subconscious memory. At some later time his stomach is too tight. He can belch no gas to get relief. He swallows air and then belches it. Before he knows it he has acquired the habit.

Neurotics, neurasthenics and hysterics are apt to get this habit just as they are prone to get the whisky habit or the morphin habit or the tobacco habit.

Of course, back of the habit lies some error. It may be overeating, rapid eating, irregular eating, or indigestion, slow digestion, dilation of the stomach or mild neuralgia of the stomach.

The habit has been acquired in an effort to find relief from some discomfort. When such discomfort shows itself in a sensible person he changes whatever is wrong. When it shows itself in a neurotic he leaves the cause undisturbed but takes to belching just as another neurotic who feels off a little takes to morphin or cocain or whisky.

Does any harm result? Yes, often. The belching of air siphons bile into the stomach. Bile does not belong there. Bile persistently in the stomach disturbs the digestion. The longer the belcher belches to relieve his stomach the more surely he embarrasses his stomach.

The persistent swallowing of air upsets the working of the gate into the stomach and also the gate out of the stomach. The stomach may become dilated through the persistent swallowing of air.

However, as bad as any of these is the frame of mind of the belcher. He is an "ailer." He probably regards himself as a dyspeptic. He is pretty certain to have some form of persistent stomach complaint. He gets the soda habit.

Of course, to start with a belcher is not thoroughly well poised or he would not be a belcher. But the habit makes him more of an "ailer."

Cause of Belching.—*F. D. writes: "What is the reason a person belches about four hours after eating, and what should be the diet of a person so afflicted? The belching generally lasts an hour or more."*

Reply.—Belching is due to nervousness. The stomach should be empty four hours after eating. If yours is not the irritation from the retained food could start the nervous belching spells. If your stomach has not emptied itself four hours after eating, the stomach muscle is weak, and probably the organ is dilated. A dilated stomach requires attention. To diet is not enough.

Excessive Belching.—*N. S. writes: "I have been belching for three days at intervals of from five to ten minutes, and I feel a lump in my throat. Sometimes I find it difficult to belch and feel as if it would relieve me, but it doesn't. It does not hurt when I eat and the lump in my throat seems to resist the saliva and sometimes I feel a burning sensation when I get through belching. What is the cause of this?"*

REPLY.—You are nervous. Control yourself. The only way to belch every ten minutes is to swallow air, otherwise there would be no gas to belch every ten minutes. You swallow air and then belch it just as some people bite their finger nails. Get back on your keel.

Must Work Out Own Cure.—*J. A. R. writes: "I note you state that nervousness is the cause of belching. Kindly give me some practical remedy for nervousness, as I am troubled with belching."*

REPLY.—Nervousness cannot be cured by a remedy. It means bad mental training. A person must work out his cure by mental hygiene.

CONSTIPATION

There are few persons whether civilized or uncivilized who do not at some time or other suffer from constipation. The old, the young and the middle aged are troubled more or less. It matters not whether they are fat or lean, outdoor workers, indoor workers or idlers; whether rich or poor, well fed or half starved they have been, are now or will some time in their lives be interested in the question.

Constipation has probably existed in all ages and in people of all nations. No human ailment is so universally prescribed for by the medical profession and no ailment is the subject of so much self-dosage. Doctors try to give permanent relief but self-dosage looks chiefly to temporary relief.

To comprehend the problem one needs a little knowledge of the intestines and their contents. The entire alimentary canal including the esophagus, stomach and small and large intestines is about five times the length of the individual. The large intestine or colon is from four to six feet long and from one inch and one-half to two inches and one-half in diameter. It is of this part of the intestine that we are chiefly concerned in considering the causes of constipation.

The colon is encircled by muscular fibers that contract and expand alternately and this motion moves the contents along from above downward toward the rectum, its lower and distant end. The lining membrane of the colon is capable of absorbing fluids from its contents or of discharging fluids into its cavity.

Too little fluid in the colon may be a reason for constipation. The lack of fluid may be caused by too little being drunk and too little poured into the bowel from its walls; or the fluid in the colon may be too readily absorbed.

Sometimes the character of the food is such that little residue is left to pass on the colon because it all was absorbed in the digestive process. Under these circumstances there is likely to be constipation, since there is little in the bowel to be moved along.

The contents of the colon is made up of waste matter that has been

collected from all the tissues of the body thrown into the bowel and discarded as no longer useful. Another item is the undigested particles of food that are passed on from the stomach through the small bowel to the colon. The next item is the fluid that is thrown into the tube from the mucous membrane with which it is lined.

Only one of the three factors is subject to control and that is the residuum from particles of food that have failed to be digested and absorbed.

Every adult of normal health and activity should have an action of the bowels each day, although two or three movements may occur with perfect health. If but little is eaten, and especially if that little leaves a small residuum to be passed on to the colon, a normal movement of the bowels once in two or even three days may be perfectly natural and no harm ensue.

When the fluids are persistently absorbed from the colon and the contents become dry and hard in the rectum with difficulty of evacuation the condition is called constipation. It is in some people chronic—that is, continuous and persistent. In those the bowel has become distended with loss of the contractile power of the muscular fibers encircling it and the usual warning sensations of a desire to evacuate the rectum are lacking.

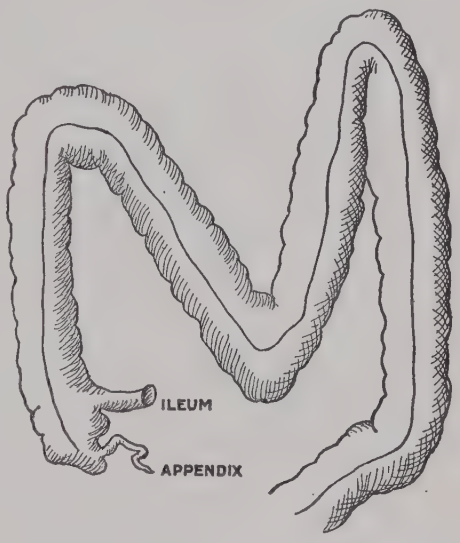


FIG. 230.—V-SHAPED COLON MAY CAUSE SO-CALLED INTESTINAL INDIGESTION.

It must be remembered constantly that the colon, especially the rectum, is largely a receptacle for waste matter where it may be retained under control for hours and even days at a time.

The most natural time for the emptying process is in the morning after breakfast. With many persons it is possible to postpone this necessary act for hours and even days but if such practice be persisted in the bowel will become accustomed to retaining an ever increasing quantity, the sensibility will be lessened or lost, the normal desire for bowel movement will not occur, and the pressure of the mass or reabsorption of excrementitious matter will cause disability or ailment of some sort.

In the early morning when both the muscular and the nervous systems are relaxed by sleep and rest an action of the bowels may be had in one who perhaps has no promptings in that direction. It is important that one take sufficient time before the mind and body become tuned up to the day's activities to attend to this important physical function. Children and youths, both boys and girls, should be carefully coached in this respect by parents and others responsible for their care and instruction.

It is important that parents should know that there is no sovereign remedy, or drug, or combination of drugs that will effect a cure of consti-

pation. Its remedy lies in knowing and practicing daily correct habits of life. Nothing will take the place of daily "going to stool" in the right frame of mind and getting relief. If this can be carried out faithfully in childhood and youth the majority of cases of constipation will be corrected.

Ultimate and permanent relief of long standing constipation must come through education in the home, the school or the college, and through the daily press; but as matters stand that is not possible today and other aid must be sought, especially for adults in whom the habit has become more or less confirmed.

Under these conditions the use of cathartics that throw into the colon large quantities of fluids that wash it free from contents gives no tone to the impaired bowel but leaves it flaccid and soft and more easily distended than it was before. Mild laxatives may be resorted to daily but these do not cure. All cathartics are for temporary relief only, and all take fluids from the body that should be retained, while disturbing digestion more or less.

The foods that are eaten have an important bearing upon the constipation habit. Fruit juices have a laxative effect with most people but there are some in whom fruits only set up fermentation and create a gas that distends the colon.

Foods that leave a residue to be carried along to the colon furnish bulk and are beneficial because they make some irritation of the mucous lining of the colon inducing a flow of watery substance that helps to soften the mass and sweep it along. All vegetables such as spinach, other greens, lettuce, celery, asparagus, cabbage and radishes leave some residue. There is also residue from lean meat.

Excessive fats and oils beyond what the digestion can absorb are carried along and mechanically lubricate the bowel and hasten the emptying process. These, however, may do harm by overloading the digestive apparatus and creating indigestion.

The outer wall of all grains is indigestible and when eaten is carried along to furnish the bulk. It does more than that. If the bran of wheat or the outer skin of corn is examined under a magnifying glass it will be seen to have a sharp edge. This sharp edge scratches the lining membranes of the colon; the irritation excites contraction in the bowel and this forces the contents along. It also increases the flow of juice into the tube, and this also favors bowel action.

It is because of the above fact that all cereals have a vogue as breakfast food and that whole wheat bread, bran and cracked wheat have been found useful as remedies for constipation.

All kinds of nuts leave a residue and in addition they contain oil; and all oil is a laxative if it finds its way into the colon.

The skin of most fruits are not digestible and are carried along to make bulk in the colon and to excite it to action. That is the principal reason why prunes have had a vogue as a breakfast food.

The pulp of oranges, even the inner part of the peeling, is edible and is useful in forming bulk in the colon. Figs have a reputation of being useful in constipation due to the multitude of indigestible seeds they contain that scratch their way along the bowel in addition to whatever of aid there may be in the fruit and skin.

Mucilaginous foods such as okra and flaxseed also are useful. Agar may be regarded as a food if it is eaten. It is not digested. It travels through the intestines as a moist, bulky mass.

Careful attention to a diet that leaves a residuum in the bowel will overcome constipation in most people. In others where the habit is confirmed and obstinate resort must be had to some laxative medicine taken judiciously and at the right intervals. In the treatment of such cases the personal peculiarities that may be the cause of the trouble must be inquired into, and this is the field of curative medicine.

The Internal Bath.—*A. R. writes: "1. What is an internal bath? 2. Should the internal bath be used as a regular routine?"*

REPLY.—1. Internal bath is a term which the manufacturers of a certain type of syringe are seeking to introduce. By it they mean the forcible injection into the lower bowel of a considerable quantity of water.

2. No.

In explanation: After the food has been broken up and digested by the saliva and gastric juice it enters the small intestine. During its travel through this twenty-five feet of tube digestion is completed. Whatever is soluble goes into solution and absorption progresses.

About five hours is required for the passage of food from the mouth through the stomach and small intestine. The contents of the small intestine are poured into the large intestine. This tube is about five feet long. The progress of food through this tube requires about forty hours. There is no digestion in the large intestine. That was completed in the small. Absorption, however, is active. Bacterial action is at its maximum in this part of the intestine.

The last eight inches of the large intestine is called the rectum. The four feet above that is called the colon. The tube is the same, of the same general structure, the same muscles, the same nerves and the same arteries. It happens that toward its lower end the intestine makes a double loop which, because of its S shape, is called the sigmoid. All of the intestine below the sigmoid is called the rectum.

The intestine is lined by a self-cleansing membrane called the mucous membrane. Whoever talks about using injections to wash that membrane clean shows that he is an ignoramus or else that he is trying to put something over on the people because he thinks they are ignorant.

An internal bath consists in the injection into the intestine of water under considerable force. In other words, it is a violently applied enema. Now you have it and that is all there is to it. The enema causes the rectum to empty itself. By its pounding force it may cause the colon to move and empty some of its contents. So far as the washing effect is concerned, the water does not go above the sigmoid. It has the advantages and disadvantages of an enema.

It is not good judgment for a man to be violently stimulating his lower bowel every day with any form of enema. Presently he will have a lower bowel which cannot be stimulated by anything.

The proper method of overcoming constipation is by changing habits of eating and exercise.

Seeks Constipation Cure.—*G. F. A. asks if there is any manner of curing chronic constipation, and if the constant use of laxatives is injurious.*

Reply.—Chronic constipation does impair the health. If the teachings of Metchnikoff are correct it is a factor in bringing about senility prematurely. It is his teaching that absorptions from the lower part of the digestive tract cause the arterial walls to thicken. There is a saying that "a man is as old as his arteries." This means that with age the arterial walls first become thicker and less elastic. Later they become brittle. That which the affected person notices is that he does not feel up to par. For years this may be all. But that is enough to make it worth while to end it. It is a common condition especially among city people.

The reasons are many but two are more important than the others, viz., lack of physical exercise and eating too small a quantity of bulky food. Ordinary walking around a factory office or store or walking around the house doing the household work does not suffice. If there is no better way of getting exercise walking to and from work is commended. A daily walk of two to four miles should help materially. If a man lives two miles or less from his work let him walk to and from it. If he lives more than two miles let him walk two miles before he takes the car or get off the car two miles from his destination and complete the trip on foot. Walking to be effective should be rapid.

The food of the city man is too nutritious and concentrated. One's dietary should contain much fruit, cabbage, salads, corn, cucumbers, tomatoes, turnips, carrots and vegetables of the rougher, tougher kinds. Apples should be washed and eaten unpeeled. The peelings are just the part which are most needed. The same is true of the peelings of plums and most other fruits. Breads and cereals containing the husks of the grain are advised. Ordinary flour is made from the inside of the berry. It has discarded the outer cellulose parts that are not worth much for nutrition, but are needed for bulk.

There is no short cut cure for constipation. Relief will only come from methods persisted in until they become the daily routine. It is not the proper plan, therefore, to rely on laxatives. When medical advice is sought, as will be necessary in many cases, do not stop with a prescription for pills and more pills. Have the physician find out the difficulty in your particular case. Have him stay by it until he does find out and then go after the cause. You cannot "short cut" in the medical end any more than you can in the habit end.

Liver Does Not Cause Constipation.—*E. B. asks: "Suppose the cause of constipation is the liver, what should be done?"*

Reply.—I doubt much if constipation is ever caused by the liver. I do not know of any way by which anyone could say that the liver was causing constipation. I think that the simpler explanation is the better and that is that constipation is practically always due to lack of physical exercise and the eating of too highly concentrated food. After a habit has been established a long time it sometimes becomes necessary to do something more than remove the cause in order that a cure may be effected. These cases will require medical attention. I do not believe that anything done to the liver will help them.

Remedy for Constipation.—*S. writes: "In replying to 'T. I. K.' you say, 'Do not take medicine for constipation.' Being a chronic sufferer, I ask what should be done to obtain relief by one 60 years old?"*

REPLY.—Try eating bran bread and bran muffins instead of white bread and partake freely of fruits, especially figs, dates and prunes. Eat sparingly of potatoes and meat but freely of vegetables, especially spinach, rhubarb, and raw sauerkraut. Sometimes a glass or even two glasses of cold water drunk about one-half hour before getting out of bed proves effective. Where the condition is the result of lack of exercise practicing bending exercises, forward, backward and laterally with the hands on the hips is helpful. Walking, of course, is always helpful. Practice good body hygiene. In some cases chewing and swallowing agar is of assistance. If minor means of this sort do not help you then be advised by some physician. By all means do not take medicine unless so directed by a physician.

Constipation.—*Mrs. M. T. B. writes: "My son, 2 years and 8 months old, has been constipated ever since he was born. I give him a teaspoon of cascara every night and that is not sufficient, for every little while he has a sick spell, fever, and vomiting and his appetite is not good. He craves sugar, candy, and sweet things generally. He is under weight and peevish. Kindly suggest a good diet for him."*

REPLY.—My guess is that you are giving him too much starch and sugar. Give him meat, fruit and vegetables. Correct his constipation with vegetables and bran bread. Encourage him to play hard in the open air and with other children.

Constipation and Pregnancy.—*Mrs. M. K. writes: "Would the fact that a young woman has suffered for a long time from persistent constipation be a danger if she should bear children? That is, would she be more liable to Bright's disease or other diseases that are liable to come on during pregnancy?"*

REPLY.—Practically, no.

Water in Constipation.—*F. A. writes: "1. Is there any cure for constipation? 2. Will drinking a quart of water or more a day make a person fat who is naturally thin?"*

REPLY.—1. Yes. The chances of cure of late cases is slight.

2. No. Drinking plenty of water makes the assimilation of food easier than it would otherwise be and thus it contributes to "taking on flesh," but as the only change in one's habits it would be ineffective as a fattener.

Castor Oil and Calomel in Constipation.—*F. N. I. writes: "Please say something as to the relative merits of castor oil and calomel as a cathartic. There is a general idea that castor oil will not act as efficiently as calomel, but that the latter is liable to be injurious in more ways than one. If calomel is injurious and castor oil is not sufficiently far-reaching, what would you recommend to take its place in cases where agar and fruits and lots of vegetables and other coarse foods seem to be without effect?"*

REPLY.—Neither castor oil nor calomel should be used as a remedy for constipation. For cases where fruit, vegetables, bulky food, bran and agar fail some physicians are recommending nonabsorbable oils. My advice to you, however, is to pass your problem up to a physician—one who has given thought to the question. You have gone as far on your own hook as you are justified in going.

Oatmeal in Constipation.—*J. E. H. recommends as a remedy for constipation the following: Put a cup of uncooked oatmeal into a quart of cold water. Let it stand over night. Drink this water and eat the oatmeal uncooked.*

REPLY.—The remedy proposed for constipation is good.

Wheat for Constipation.—*Z. R. recommends the following as a cure for constipation: "Take wheat in the grain, clean it as best you can, and grind it in a coffee mill. Then cook it about an hour for breakfast. You can eat it with milk or cream. It is cheap, wholesome, and good. It will cure you of constipation."*

Senna in Constipation.—*R. writes: "Will the daily use of senna leaves as a laxative tend to aggravate an obstinate case of constipation, or cure it? Is there anything better to use?"*

REPLY.—It will have a slight tendency to produce constipation. Bran or agar with plenty of rough food is better.

Laxatives.—*R. E. V. writes: "What is your opinion of a laxative compound from aloin, strychnin, belladonna and ipecac? If taken two or three times a week by one troubled with constipation would there be any harmful effects?"*

REPLY.—This is about as harmless a medicinal laxative as there is but bran, vegetables and fruit are better.

Bowel Obstruction.—*M. E. R. writes: "I have a strange feeling in my stomach. Sometimes it seems as if it is in the right side of my stomach, and sometimes near the center. It is not a pain, but seems as if something is clogged there. It has been like this for about a week. I have a rumbling sound in my bowels. Do you think I have appendicitis?"*

REPLY.—Nothing in the history written suggests appendicitis. It does suggest obstruction, partial and incomplete. If thorough purgation does not prove this supposed partial obstruction to be fecal you had better see a physician.

What to Do.—*N. H. L. writes that he is "a young man greatly troubled with indigestion." He then proceeds to describe a constipation which has not yielded to the continued use of pills. He wants to know what to do.*

REPLY.—Constipation is prevalent among office and store employees in cities. It is rare among laboring men and women.

Several things must be done to bring about a cure:

1. Eat bulky food in large quantities, apples unpeeled, all kinds of fruits with the peeling wherever it is possible, cereals, whole corn bread, whole wheat bread, wheat bran, celery, spinach and radishes. Especially eat the tougher, woodier parts. Decrease the amount of meat, milk, white bread and other less bulky foods. When meat is eaten consume the stringier parts. The point is to go after the rougher parts of meat, vegetables and breads instead of trimming these off or leaving them on the plate unconsumed.

2. Physical work, particularly strenuous work which brings the abdominal muscles into play.

3. The plan mapped out must be persistently followed. Enemas and pills are makeshifts.

If the above plan does not work out your salvation you must have your case studied and a plan laid out for you and then you must follow it persistently. Your condition is due to wrong habits and nothing short of a changed habit will help you.

Pumpernickel in Constipation.—*Inquirer writes: "I have been advised to eat bran bread for constipation. My father says German pumpernickel will answer the same purpose. Is this correct?"*

REPLY.—It has much rougher fiber in it and will give satisfactory results for most people if they will eat enough of it. Others will require bulkier, coarser foods.

Try Eating Wheat Bran.—*J. E. S. writes: "I have been troubled with constipation as far back as I can remember. I am 28 years old. I also am afflicted with indigestion. I always eat slowly, thoroughly insalivating all my food."*

REPLY.—Cure the constipation by eating an abundance of wheat bran. When you are relieved of constipation your indigestion should end of itself.

Try Eating Bran and Agar.—*C. H. R. writes: "In obstinate costiveness what is the fundamental trouble? Is it not torpid liver? Does not a weak stomach cause costiveness? I eat cherries, pineapple, cheese, white bread, and corn beef, and drink lemonade, buttermilk, chocolate, and coffee."*

REPLY.—As to torpid liver, no. As to weak stomach, no. Most cases of constipation are due to concentrated food. Add to your present diet a cup of bran, cooked if you like. Also eat a handful of agar a day. Drink plenty of water. These methods failing, you had better see a rectal specialist.

Use of Bran Bread.—*E. B. writes: "Kindly state how much bran bread one should eat daily for constipation. Is there any danger of eating too much? You have published recipes, etc., but never have stated what amount should be taken and how often. I eat several pieces at every meal."*

REPLY.—Enough to get results is the measure. Eat plenty of fruit and vegetables. Drink plenty of water. Remember the need of an abundance of water in summer.

No Harm from Bran.—*E. P. H. writes: "Is it harmful to eat bran in its crude state, providing, of course, that it is well mingled with saliva before swallowed?"*

REPLY.—No.

Suggestion for Constipated.—*Well-wisher writes: "Here is a good, tested, and tried recipe for bran gems: 'Mix a teaspoonful of baking soda in one-half a pint of flour, with three-quarter teaspoonful of salt. Add one pint of coarse bran. Mix six tablespoonfuls of molasses in one-half a pint of milk. Stir all together and bake in gem pans in a moderate oven for about twenty minutes. Eaten with butter, they are as good as graham or wheat gems and inexpensive, as they require no eggs and no butter. A cup of prune juice drunk a half an hour before breakfast and agar taken twice a day at meals with moist foods, together with bran gems, have been known to cure aggravated cases of chronic constipation of years' standing."*

REPLY.—We print the above as a suggestion.

Uncooked Bran Better.—*H. M. S. writes: "Will eating bran bread aid constipation as much as using the uncooked article?"*

REPLY.—No.

Laxative Food.—*Subscriber writes: "Is flaxseed good for constipation? If so, how should it be used?"*

REPLY.—Flaxseed meal as an ingredient of a laxative food would have the advantage of containing a laxative oil as well as "roughening." It would have the disadvantage of spoiling more rapidly. It is better suited for use as an ingredient of a laxative food mixture than as a laxative food of and by itself.

See Physician for Constipation.—*L. S. writes: "I have been troubled with constipation for about five years, although I have lived on a strict diet of laxative foods. Can you tell me of any method of correcting this trouble?"*

REPLY.—If agar, bran, plenty of water and an abundance of fruit have not cured you you are in need of the services of a physician. There are specialists on bowel troubles. Perhaps one of these can cure you without an operation.

Enema in Constipation and Indigestion.—*A. D. D. writes: "1. Would you advise the use of a stomach pump, or enema, for indigestion and constipation? 2. Do you think that by using one occasionally one will become dependent or a slave to it? 3. Does indigestion cause cold feet and hands, and a person to be cold natured in general?"*

REPLY.—1. No.

2. Yes, though much depends on the frequency of use. A large proportion of the indigestions are due to constipation. When constipation is relieved the indigestion disappears. The way to cure constipation is not by using drugs or enemas but by changing one's habits of eating. Cut your meat and bread bill down one-half and double your bill for fruit, vegetables, molasses, preserves and candy.

3. Yes.

Home Treatment for Constipation.—*Dr. S. recommends the following: 1. Before rising, drink two-thirds glass cold water. 2. Automassage five minutes. 3. Dress in union suit and take constipation exercise. 4. Go to stool. 5. Breakfast. 6. Stool again, if first attempt was failure. 7. Lunch. 8. Dinner. 9. Bedtime. Wear moist abdominal bandage all night.*

Constipation diet—[a] Liquid intake. [b] Food rich in fruit acids. [c] Food rich in fruit sugars. [d] Food rich in cellulose. [e] Special diet; cranberries, bran, agar, etc.

Food in Constipation.—*Reader writes: "1. What foods should be avoided by constipated persons? 2. Is it harmful to take any sort of a bath after a meal?"*

REPLY.—1. None. The condition is a sin of omission, not commission.

2. It is better not to take a cold bath or any other bath which is intended to cause a shock.

What Is Agar?—*M. S. writes: "What is agar? You mention it as a cure for constipation. Where can I get it?"*

REPLY.—Agar is a seaweed. It has no taste and no nutritive value. It is valuable because it holds on to water. Your druggist will get it for you if you insist.

Keep On With the Oil.—*Mrs. R. H. G. writes: "A great many of my friends were converted to the use of paraffin oil after reading the article in a magazine. The article said that a prominent London surgeon recommended the use of the oil, refined and purified; that its use prevented auto-intoxication; that it was not absorbed by the body. We all started its use, enthused by the claims of the article, and the results have been great. One person, a sufferer from bilious headaches, has had none since; another has lost her depression. In fact, we all swear by the paraffin. Then along you come and say of its use, 'Nothing is absolutely harmless.' We were all frightened. Now, please be explicit. We are supposed to take a dessert-spoonful of the oil every night forever. It is supposed to add to our years; certainly it has added to our physical comfort. But if there's the least modicum of future harm in its continued use we want to know it. Please tell us and relieve us all."*

REPLY.—A few reports of harm from imperfectly refined oil have been printed. Your attitude is wrong. To avoid everything absolutely without risk you would quit breathing, eating, sleeping, riding on the cars, going on the street, et cetera. Hazards cannot be escaped. Try to avoid the extra hazards and forget the ordinary hazards. The oil is benefiting you. Exercise care to get a good article and use it.

Patent Medicine in Constipation.—*V. E. D. writes: "1. What is veracolate and what are its properties? 2. Would its use for ninety days tend to deaden the natural action of the bowels? In other words, would the bowels learn to depend on the stimulation of the drug and not function naturally? 3. I am 5 feet 5 inches tall and since July 5 have taken down my weight from 190 pounds to 160 pounds by reducing amount of food consumed and eliminating fats, sugars, and starches. I work in the open air most of the time, but am constipated unless I use something to help. Will veracolate do it?"*

REPLY.—1. It is said to be a bile salts, phenolphthalein, cascara and capsicum, and to be a mild laxative.

2. In some measure, yes.

3. Yes. Probably bran and agar would be better.

SEASICKNESS

In *The Dietetic and Hygienic Gazette* Dr. Boyd tells us that seasickness is not a disease but a condition. Most of those who suffer from seasickness will find themselves unable to judge whether Dr. Boyd is right or not but they will agree with Grover Cleveland that it is a condition and not a theory which confronts them.

Furthermore, Boyd tells us that most authorities recognize two forms of seasickness—the psychical and the somatic and that it is often very hard to make a differential diagnosis between these forms. In other words, some

of those who have it really have it and some think they have it and it is very hard to tell the sheep from the goats.

There is no doubt but that many people can prevent seasickness and that many others can make life more bearable while suffering from it by proper attention to certain details. The first of these is to take a dose of citrate of magnesia the night before sailing. The second is to eat frequently but very sparingly during the voyage.

If the steamship companies would charge one fee for the haul and the lodging and then serve all meals à la carte they would do more to prevent seasickness than the ship surgeons have ever been able to do.

Then comes our old friend fresh air—the sovereign remedy, good for all the ills that flesh is heir to. A good stateroom with plenty of window access to the fresh air, a good deck place occupied by a good deck chair, and that occupied by the party of the first part just as many hours a day as possible are what is needed.

And do not forget that Boyd says it is almost impossible to tell the imagination cases from the others. There is a pretty fair chance that you may be one of the imagination cases and not know it. At any rate give yourself the benefit of the doubt.

Bring your mentality to bear on the side of escape. Think about the other fellow. He is probably worse off than you. Maybe your endolymph is surging in your semicircular canals. If so, you may decrease the effect of the surging by letting it surge unnoticed, and certainly by letting it surge unanticipated.

If in spite of all you have done trouble overtakes you lie as quietly as possible for as many hours as possible in the open air. Rest a short while after eating. Eat simple food and but little of it but eat.

Consult the Ship's Doctor.—*C. B. C. writes: "I have taken a number of long ocean trips, and, being susceptible to seasickness, I have used Mother Sells' seasick remedy, which has prevented acute illness, and I have not noticed any harmful results except extreme dryness of the throat. Can there be anything harmful in its use?"*

Reply.—I judge you mean Mothersill's seasick remedy. If so, you will find an article on it in "Nostrums and Quackery" (published by the American Medical Association), page 475. According to that publication it depends for its effect on its content of 8 per cent caffein and 46 per cent acetone chloroform. The book referred to says it does not do all that the label claims. If you use it have the ship's doctor keep an eye on you.

To Avoid Seasickness.—*J. B. writes: "Would it be dangerous for a woman who is five months' pregnant to cross the ocean? How can one prevent seasickness?"*

Reply.—1. There is some danger but it is not great unless she is exceptionally subject to seasickness.

2. Eat lightly several days before sailing. Keep the bowels in good condition. Keep the mind on other things. Do not expect to be sick but keep cheery and optimistic and you will do much to avoid it.

CHAPTER XXXVIII

Hernia

Why hernia? Whenever any part of the body contains organs of size, weight, and importance the walls are bony. The head carries the brain in a bony case. The chest carries the lungs and heart likewise in a bony case. The abdomen and pelvis constitute an exception. At that the method of formation of the abdominal wall during fetal life is the largest factor in producing hernia.

Hernia runs in families. One practitioner found a family history of hernia in one-third of his cases. Another found that more than half of 700 hernias were congenital.

Some of the external sexual organs start their development in the abdomen and about the middle of fetal life push their way to the outside. This leaves a weak area, the inguinal ring, in the abdominal wall through which a hernia can escape either then or later.

The great blood vessel of the leg is formed in the abdomen and pushes its way into the leg. The point of exit, the femoral ring, makes another weak area.

Until after birth the great blood vessels which feed the child enter through the umbilicus making another weak ring.

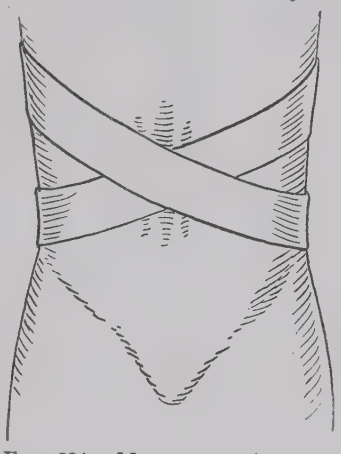


Fig. 231.—Method of Applying Adhesive Strips for Maintaining Reduction in Infantile Umbilical Hernia.

There are an even dozen of these weak areas in the abdominal wall. In about half of them an open canal persists until after birth. Not that there is an opening through the skin; that is extremely rare. The skin is only a covering. It has but little strength. The weakness is in the muscles and fascia layers which should be and elsewhere are tough and strong.

If a man as he walks rapidly along will hold the palm of his hand against his abdomen he will feel the jolt of his organs against the wall with each step. But that jolt is nothing as compared with the drive of coughing, sneezing and vomiting.

In a fit of coughing the intestinal drive against the abdominal wall is so hard that occasionally some weak place gives and into the open space a loop of intestines pushes. This is what is called an acquired hernia. When the intestines push into a ring which has never closed it is called a congenital hernia.

In addition hernias take the name of the weak spot through which they push; for example, inguinal hernia, femoral hernia, umbilical hernia,

Of every one hundred hernias eighty-four are in the groin—inguinal; ten are just outside the groin—femoral, and five are at the navel—umbilical. The other one per cent is divided between the other nine locations.

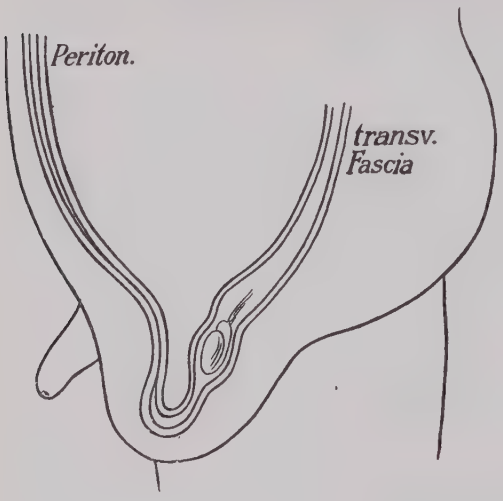


FIG. 232.—A HERNIA SACK IS A POUCH OF PERITONEUM.

Hernias are important because of the inconvenience and disability they cause and the dangers they induce. Some strain on the abdominal wall converts a weak place into a hole, just as a crawfish hole breaks a levee in times of high water. Through this hole any organ in the abdomen or pelvis may pass. As a matter of fact only two structures pass with any degree of frequency—loops of the small intestine and pieces of omentum.

In the exposed locations the contents of the hernia are extremely liable to become strangulated or ruptured or otherwise injured. One out of every thirty ruptures strangulates or gets seriously hurt somehow. A hernia emergency is a great emergency. It is no child's play. Quick eye and instantaneous action are required. None but the best surgical skill will avail.

Hernias are also important because of the disability they cause. Six inches of intestine outside the abdomen gets in the way, limits work, and makes the party timid about taking necessary exercise. When it is pushed back by a truss some of the timidity will pass away, but the truss itself gets in the way. Nevertheless, a truss must be worn.

The question arises: What should one do about a hernia? If the hernia is in a baby the chances are

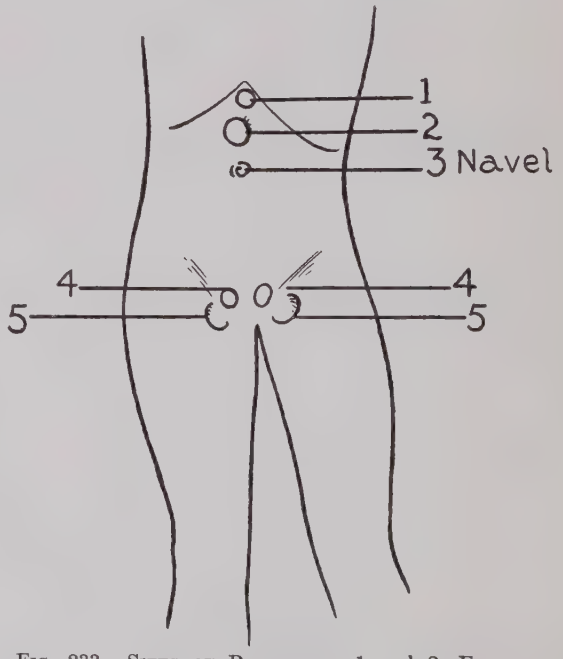


FIG. 233.—SITES OF RUPTURES: 1 and 2, EPIGASTRIC HERNIA; 3, UMBILICAL HERNIA; 4, INGUINAL HERNIA; 5, FEMORAL HERNIA.

six out of ten that a truss will cure it. If the person is between one and ten years of age, the chance is one to ten. Of children less than fifteen years of age trusses will cure one in twenty. When the affected ones are more than fifteen a truss will cure an occasional case, but these cases are too few to count.

This, then, is about a reasonable policy: When a hernia is noted in a baby give it about a year's trial under simple truss bands. If at the end of that time it is not cured have it operated on.

What shall the adult do? The answer to that question depends on the answer to other questions: Am I to be in reach of the best surgical skill in case of strangulation? Do I want to run the risk of being the unlucky thirtieth? How well does a truss hold any hernia up? How many spells of pressure colic have I had? How much am I inconvenienced by the truss? How much am I disabled by it?

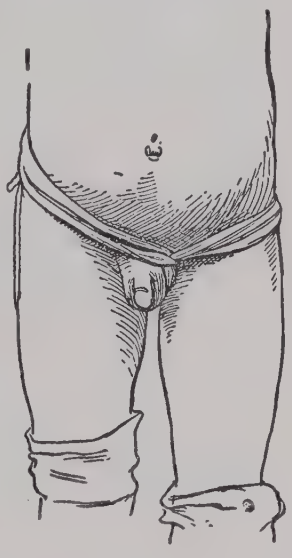


Fig. 234.—Skein of Worsted Truss.

If the decision is in favor of operation shall the operation be by injection or by cutting? In the injection method the canal is filled with paraffin or with some irritating chemical. These methods are both inefficient and dangerous. It is dangerous to inject an uncontrollable irritant poison into the tissues hoping that it will inflame just enough and not too much. The cures are exceptional and rarely permanent.

The cutting operation consists in damming the hole by sewing over it the strongest muscles and fascia found in the neighborhood. It is the common sense method.

The best opinion is that no kind of an injury or accident can cause a hernia. Dr. Plummer, chief surgeon of the Rock Island Railroad, says: "In my opinion, a single strain can never be the sole cause of a hernia. I have seen patients that had been run over by wagons and by automobiles, squeezed between cars, struck by flying boards, who have fallen from heights, been struck by locomotives, who have suffered ruptures of the stomach, intestines, kidney, liver, and fractures of the bones from the skull to the feet, but in no case have I seen an inguinal hernia resulting from any of these injuries or from any injury."

Now, there is no doubt that men have noticed hernias for the first time just after an accident of some sort or another. They charged the rupture to the accidents. They acted in good faith. What fooled them?

What happens when hernia develops is this:

The intestines push their way through the wall of the abdomen; a loop comes to lie in a sac; this sac is covered by skin but it is without the wall of muscle which we call the abdominal wall. The sac is lined by the peritoneum, the covering of the intestines. The muscles of the abdomen are laid down in layers. There are weak places in the wall. The weak places are the spots where the wall did not grow together until the child was nearly ready for birth. For instance, one of the weakest spots is the navel.

Hernia never happens except at one of these weak spots. Furthermore, hernia does not come on suddenly. The protruding intestines must push the peritoneum before them in order that the sac shall have a lining. This lining pushes slowly. The weak place gives slowly.

Dr. Coley says: "In the vast majority of cases hernia is a disease rather than an accident. The congenital defect is the main cause of a hernia, while the immediate or exciting cause plays but a minor rôle."

The congenital defect he calls a disease. By it he means that the man with a hernia was born with one or more weak places in his abdominal wall.

How does it happen that men frequently notice hernias for the first time following accidents? The hernia was there before the accident. It was small. It was gradually pushing its way through the wall. It caused no pain.

When the accident had occurred the man felt of himself for the first time, or for the first time he had a careful examination. The small soft swelling was noticed. If the hernia was inguinal it may have pushed its way to its final location. In case it was umbilical or femoral it was found as a soft, non-tender swelling.

A hernia does not cause many symptoms. It is not tender or painful. If pain is present it is because the loop of the intestine is being pinched. The pain is colic and it is in the intestine. The sac does not pain or give pain. Any painless condition is liable to steal upon those affected.

The history of hernia, then, is this: The person is born with a weak spot in the abdominal wall. Through this weak spot a loop of the intestine gradually pushes. Prolonged coughing and straining hasten the process. The presence of hernia is generally discovered by some chance. Hernia usually causes no pain. A painful hernia should have medical attention at once.

Hernia.—*J. E. S. writes: "In the case of a hernia in an adult, is the person in as good a condition after a successful operation for it as he was before he was afflicted? Do the life insurance companies reject an applicant because he has had an operation for a hernia? I do not want to wear a truss, because it keeps the abdominal muscles from healing over the 'hole' that the intestine has made under the previous abnormal condition. A hernial supporter is almost worthless in my case because it does not come low enough, and at times it seems to bear down against the hernia. I thought I should get an ordinary web abdominal supporter and have a few thicknesses of felt sewed directly over the affected part. Is this a wise procedure? What causes a hernia ordinarily? I contend that it cannot be* [*or is not*] *caused by ordinary coughing, except in a spasmodic cough or a whooping cough."*

Reply.—1. Yes.

2. No.

3. I do not think it will avail.

4. If the wall is very weak an ordinary cough may cause hernia. As the child is forming the abdominal walls grow from the region of the backbone around toward the front to inclose the abdominal cavity. It is very necessary that certain openings in this wall be left open until the time of birth, or very near it. One of these openings is the navel; others are in the groin. These openings close imperfectly because they close late. If the imperfection is very great any cough will cause the weak place to

open and let the intestines through. If the closure is very strong no cough will break it. A truss should press on the opening and nowhere else (so far as possible). If when a truss is worn there are colicky pains it is a sign that the truss does not properly close the opening and the intestines get pinched. This seems possible in your case.

No Bar to Marriage.—*E. H. writes: "Do you think it would be advisable to marry a man with a double rupture? He is healthy otherwise. I have been told not to marry him. I am healthy; a little hard of hearing caused by catarrh."*

Reply.—Yes. Your difficulty is more liable to be transmitted than his is.

Rupture.—*P. S. J. writes: "Can a rupture on each side be cured without an operation?"*

Reply.—Sometimes a truss will cure—very exceptional. All other methods of cure are operations. Sometimes injection of paraffin cures—but it is uncertain and risky. Sometimes injection of an irritant cures—also uncertain and very risky. What is known as a radical operation is safest and surest.

Operation Should Cure.—*C. W. writes: "About fifteen years ago I underwent an operation for hernia, and a supposed cure was effected. The rupture has since come back again. Do you think that, with the rapid strides made in the treatment of this ailment, a permanent cure could now be had by undergoing a second operation? Would you advise continuing to wear a truss as long as no ill effects are felt and the truss is properly fitted?"*

Reply.—An operation should result in permanent cure. The exceptions are few. If your hernia never gets caught and never produces colic you should decide as to operation on the basis of the amount of inconvenience from the truss [and the hernia]. If you are greatly inconvenienced be operated on.

Need Operation for Rupture.—*Jane writes to ask if there is any cure for rupture besides operation. The rupture was caused after an operation for appendicitis and fibroid tumor (abdomen). She asks: "Should one wear a supporter or bandage all the time?"*

Reply.—1. No.

2. Yes. Rupture is purely a mechanical condition and cure must be mechanical. In rupture the muscles have pulled apart leaving a weak area through which pressure forces the intestines. The only cure is to pull the separated structures together and fasten them securely.

Cure for Rupture.—*A. E. G. writes: "Kindly state whether there is any absolute cure for rupture outside of the knife, Christian Science, or similar faith. I have come in contact with absolute proof of cures under all of the above, but regarding other methods, nothing more than printed testimonials."*

Reply.—A man with a rupture should wear a properly adjusted truss. When the rupture is so troublesome that radical cure becomes advisable

the proper thing is an operation. Nothing else can be recommended.

Band May Help.—*D. H. H. writes: "Can a child born with a rupture be cured without an operation? If so, how?"*

REPLY.—A band well adjusted sometimes helps the muscles and fascia to cover over the hole. If this result does not follow within two months it will not follow. No other method except operation need be tried.

Truss Will Not Cure.—*Subscriber writes: "I have a single rupture. Can it be cured by wearing a truss? Are doctors who advertise to cure without an operation reliable?"*

REPLY.—1. No; it can be held up but not cured by a truss.

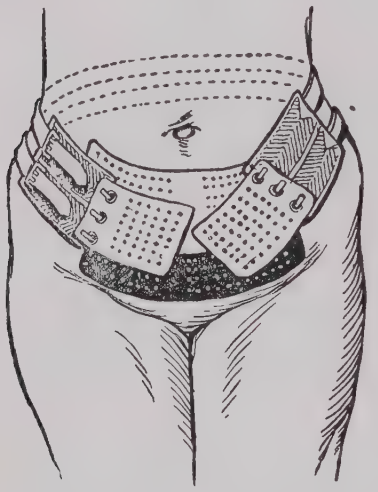


FIG. 235.—ABDOMINAL SUPPORT, PLASTER AND WEBBING (Dr. B. Schmitz).

2. No; what they do is to inject something into the sac. This is an operation as much as the ordinary surgical procedure. It is less certain to cure and is more dangerous.

Not Cured; Held Up. — *E. M. writes: "Can hernia possibly be cured by the so-called plaster pad truss or by any form of manipulation?"*

REPLY.—Cured, no; held up, yes.

Patent Hernia Remedy. — *W. P. W. writes: "Has lymphol the properties claimed in this pamphlet, and is this treatment likely to cure?"*

REPLY.—The remedy purports to cure hernia radically by rubbing with a liniment.

No, as to each question.

Knife for Cure.—*A. L. T. writes: "For a healthy male, aged 40, do you consider any treatment for inguinal hernia, other than the knife, worth bothering with?"*

REPLY.—Truss for relief; knife for cure. Other methods are usually a disappointment.

Rupture in Baby.—*J. H. writes: "1. What is cause of rupture in boy less than a year old? 2. What do you think of circumcision? 3. What is indicated by baby now four months old that has been holding his head up and trying to sit up ever since birth?"*

REPLY.—1. Straining; possibly violent crying.
2. Frequently advisable; sometimes necessary.
3. Nothing. Do not encourage him in his efforts.

Hernia and Rupture.—*R. W. N. writes: "1. Is it generally advisable to operate for cure of hernia or rupture? 2. Is the operation for rupture often fatal? 3. Is laughing gas and oxygen superior to ether for an anesthetic? If so, why?"*

REPLY.—1. Yes, when the operation is done by a careful surgeon and the person operated on is not too young.

2. No.

3. In short operations, yes; in prolonged operations, no. It produces less congestion and less degeneration. For this reason it is preferable when operating on persons who suffer from chronic bronchitis, other lung troubles, or Bright's disease.

CHAPTER XXXIX

Obesity and Thinness

TOO FAT OR TOO THIN

I presume the idea is general that the average man wants to be fatter than he is if he is thin, or thinner than he is if he is fat. Certainly they write that way and the getting fatter or thinner is talked about every time a group get together.

You and I must not take these complaints too seriously. The speakers are joking; they do not mean what they say and they do not intend that you and I should believe them.

A woman will complain loudly about being fat when she has just seen some woman whose lines are very graceful but she will not feel deeply enough about it to change her methods of living. A man, having had trouble fastening his collar, will talk about the tribulations of a fat man and will then walk out to his dinner and eat in such abundance as to add still further to his flesh.

Men are about what they really want to be, their complaints, pretensions and idle statements to the contrary notwithstanding. A man's weight represents about that balance between eating and working which best suits him. Though if he be thin he may feel inconvenienced by the cold or if he be fat by the heat, he finds enough convenience all in all in eating just about what he does and working about as he does to more than offset the inconvenience which he feels. Fat people should either "put up or shut up."

A man who is willing to stand the inconvenience of it can be as fat or as thin as he pleases. This is true of well men and even more than is commonly thought of those who are diseased. But the road is long and he who travels it must tolerate with inconvenience.

Cures which claim that change in habits are not necessary are rank fakes. We shall suppose that a man has carefully weighed the situation and has decided that it is best that he should get thinner. He is willing to undergo the trouble of it all, to readjust his eating and his work. He can make use of a system if he pleases provided he does not neglect to change his habits. He may even be benefited by "a system," for unless he is unusually endowed with "grit" he will need something definite as a staff to lean on.

How is obesity brought about?

Passing through some period in which extra work is done the person gets in the habit of taking more food and the digestive organs of digesting it. This extra food was needed on account of the extra work. When the period of work was passed his eating and digesting habit have been established. The extra nutritive material not being required for work is stored as fat.

Children and young people take an excessive amount of exercise; they add to their bones and muscles; they get adjusted to this demand; they grow up, quit growing, and take up sedentary occupations. Something must be done with the surplus of food to which they have become accustomed; it is stored as fat.

A woman nurses her baby for a year. She must eat enough for the two. The demand stops; she stores the excess as fat.

Feeding, getting fat, and getting thin are matters of chemistry and mathematics and nothing else. When Howe or Hawk at the University of Illinois start out to make a feeding experiment, they begin by getting their animals in a nitrogen balance—that is, they weigh and calculate just what the animal takes in the shape of food and what it passes as waste. When the nitrogen passed out exactly balances that taken in a state of nitrogen equilibrium is established—the animal neither gains nor loses.

Starting with this they can run the weight of the animal up or dowr precisely as they choose and can calculate to a nicety just how many food units are required to make a given change.

In the same way Atwater of the United States agricultural department establishes a heat equilibrium and with an instrument called a calorimeter he can run heat up or down and measure the relation of foods to it. So much of this work has been done, results are so certain, chemistry is such an exact science that were it not for individual and species peculiarities it would not even be necessary to "try it on the dog."

We can analyze foods and get their calories and their nitrogen units. By calories we mean the heat and work value of foods; by nitrogen units we mean their nourishing powers.

But a chemical analysis does not always give results which work out right when the substances are put into practical use. In the first place, there is no stone wall dividing these uses and each under certain circumstances can get somewhat into the other's field. We use kindling to start a fire and coal to continue it. But kindling can be used to continue a fire and one can even start a fire with coal.

The principal reason for "trying it on the dog," however, is the difference in the powers of digestion and assimilation of different animals. One of these qualities pertains to the food itself. It is called "units of energy required for digestion."

Whole milk, as compared with bread in calories, runs 310 to 1,215; in nitrogen, 3.3 to 9.2. But these are somewhat offset by the high digestibility of milk, from 95 per cent for its fat and 97 per cent for its protein to 98 per cent for its sugars. Milk from an economic standpoint does not make a good showing until this third point is taken into consideration.

In addition to the difference in the case of digestion of different foods there is a difference in the digestibility of the same food by different kinds of animals. A dog eating meat can extract the largest amount of units from it with the least energy. A cow eating meat could get food units from it with the greatest difficulty. This is, of course, the great value of milk; it is the only common meeting ground for all higher animals.

In addition to the peculiarities of race there are individual peculiarities and right here is where the great difficulties arise in our methods of dieting.

The cry is for "short cuts," "lazy measures." People want diet lists. The handing out of diet lists is about the same sort of quackery as patent medicine cures for obesity.

Of course, the really scientific way would be to follow the methods of Chittenden, Atwood, Howe and Hawk and scientifically measure work, food, intake and excretion and then adjust the diet and work in such a way that on, say, January 1, 1913, the weight would be, say, 160 pounds. But that is too much trouble and nobody would submit to it.

Is there any compromise way, any way founded on good science and good sense and at the same time less difficult? Yes.

Let one keep his work and worry—for worry is work—as uniform as possible. Let him weigh accurately. Let him measure and weigh his food and increase or decrease it until he finds the quantities which cause him to change in weight at the rate which he has planned for himself.

The plan provides that he keep accurate account of his work. In practice he can allow a good deal of leeway for inaccuracy. There is no need for the scientific exactness demanded by laboratory experiments.

It would be very much easier if a quantity standard could be set and those who are "taking the cure" could follow that blindly. But the variants are too great. The variation for the difference in percentage of values which one man can extract from food as compared with another is conservatively at as great as 25 per cent.

The second factor requiring variation is the amount of labor done. A man doing hard physical labor will require 50 per cent more food than one who does but little. The man doing hard mental labor—particularly as regards worry and anxiety (since these work day and night)—will require more food than the man following a routine mental occupation.

The third factor requiring variation is the season of the year. Between cold and warm weather a difference of at least 20 per cent in the amount of food is required. To keep up heat in winter requires food, especially fats. This applies to the man who is exposed to cold in winter. It does not go with the man who sleeps in a hot room, gets up, puts on lots of wraps, walks two blocks to a car and then stays in a warm office until he starts home at night.

The stimulus of a cold skin means a need of more food. The second man may call it winter but for him it is summer and he should not increase his food. Say, then, 20 per cent variation according as men are exposed to cold.

With such wide variation in the amount of food required for different people it is just as impossible to lay down a quantity standard for all people as it is to write out a diet list. The only plan is for each one to regulate his quantity to suit his work, his experiences, the seasons, and his peculiarities. Having established this, he can work up if he wants to get fat; he can work down if he wants to get thin. But up or down, it will be work.

Getting fat will prove more difficult than getting thin but if consumptives who are in the nonfebrile stages do get fat whenever properly controlled, "the lean kind" should not lose hope.

Finally there should be no intemperance in changing weight. A plan of gradual change is wise. If getting fat and thin is subject to mathematical

and chemical control it is within the reach of any who are willing to undergo the necessary inconvenience.

REDUCING AND FATTENING

Sugars and starches the chemist groups under the head of carbohydrates. When the animal body burns carbohydrates energy is produced. Grease and fats the chemist groups under the head of hydrocarbons. As the word hydrocarbon is liable to be confused with carbohydrate by the readers of this article I shall use the term fat instead. When the animal body burns fat heat is produced.

Albumins, whether from meat, milk, or vegetables, the chemist terms protein or proteids. When proteids are burned the elements produced go to repair tissue. The salt and similar substances in foods the chemist terms salts. When these are absorbed and go into the tissues themselves, they are used to repair tissue.

Anyone reading the above would get the idea that the different kinds of food are pigeonholed to stay—that carbohydrates can make energy only; fats heat only, and proteids repair material only. The fact is that a good deal of interchange is possible. When one needs energy and cannot get carbohydrates, fats and proteids can help out; when one needs heat and grease cannot be had, the other groups help out, and when one is doing things that ordinarily call for proteid and enough proteid cannot be had, by eating plenty of starch and sugar the proteids of the body can be spared.

Arctic explorers have found that they can prevent their muscles from being burned out by feeding their life fires plenty of sugar.

With this foundation, my readers will be able to understand what follows.

The greatest authority on diet for disease is Professor von Noorden of Vienna.

Are you fat? Do you want to reduce? Then read what the great Austrian says about it. He tells us that we must get rid of the idea of something for nothing. The only way to have a cure is to earn it.

When a man buys one of those get-thin-quick-Wallingford obesity cures he wants to cheat the game. He ends by cheating himself. The Wallingfords in the obesity business know that the suckers want to cheat and they see to it that they cheat themselves while Wallingford acts as receiving teller.

Von Noorden says: "It was formerly thought that certain foodstuffs were especially bad for the corpulent, or the reverse. We now know this is not true. The amount of fat gained or lost by the body depends ultimately on the ratio between its requirements in calories and the actual supply."

I should have explained the term—calories—earlier. It means heat units. It is a measure of the heat producing power of the food. As a measure of the energy producing value it is fairly good. As a measure of the repairing value of food it is only moderately good. Where we are limited to one way of measuring the value of a food the calorie is the measure employed.

You will note that in the above quotation von Noorden tells us that the way to reduce is to reduce the fuel value of the food taken below the re-

quirements of the person reducing; in other words, to force him to supply the deficiency by burning up his own fat.

The natural way to proceed is to reduce equally the three groups. Von Noorden tells us that that does not work. The appetite is satisfied by bulk of food, not by quality. The dieting man must not get too hungry. Furthermore if his food is not bulky he will become constipated.

The object should be to make the heaviest cuts in those foods presenting the most nourishment in the least bulk. He therefore excludes cream, butter, fat meat and all other forms of grease.

Those of us who eat the tender meats made from fat, high grade pointed beef get a good deal of fat in the lean. His diet list allows about four ounces (a quarter of a pound) of protein (lean meat, for instance) a day and about eight ounces (half a pound) of starches and sugars.

Bread is more responsible for obesity than any single article of diet. The reason is that bread does not usually figure in the count. If one eats at a restaurant the rule is that bread is not charged. If one recounts what he eats at home he tells his story in terms of meat and vegetables. Bread is what the New Orleans man calls lagniappe—thrown in without charge.

When one weighs his food as a part of a dieting program he discovers what a heavy bread eater he has been.

Von Noorden is of the opinion that rapid cures of obesity can be free from danger if the food bulk is kept up and the blood pressure is adjusted by drinking water. On the subject of cure by refraining from water he says:

"The amount of water is entirely without influence on the process of fat reduction."

Water should be used to fight the disturbances of circulation. When the man feels exceedingly faint and "gone" he needs a drink of water to increase the volume of blood.

Generally speaking, von Noorden is in favor of slow reduction and against rapid reduction.

To sum it all up, the way to reduce is to eat less food than your system requires, not somebody else's system—your system. In reducing the food it is advisable to eat within limits of bulky food of low food value. The group of foods to be most cut are the fats.

There are many people who think they want to get fat. Some of them want to get fat and some only think so. If a person is of a consumptive family, or has consumption, or has been cured of consumption he had better get fat and stay fat. All others are better off as they are.

There is a large group of thin-as-a-rail, highly nervous people who are most anxious to get fat. They sometimes go to great trouble to get fat. Usually they have an idea that if they get fat they will be less nervous.

It is the other way round. When they quit worrying, move out into smoother waters, get less nervous, they begin to fatten. But there is no use lecturing; there are large numbers of thin people who want to get fat.

Von Noorden tells us that in his clinic they are able to fatten patients on an average of four pounds a week. This is better than the average in the consumption sanitaria.

This is the von Noorden way. He is seldom able to give more than four ounces of proteid a day. If he tries to give more it brings on indiges-

tion which defeats the object. The carbohydrates are raised as much as is possible but it is seldom possible to give more than ten ounces a day. Four ounces of proteid and ten ounces of carbohydrate give 1,400 calories.

To this diet he then adds as much fat as the patient will stand. He usually gets up to ten ounces. This gives 2,700 calories a day. 2,700 calories digested and absorbed by a man not doing manual labor will put on fat.

In order to get a person to take that much food value in a day good cooking is required. By good cooking is meant skillful covering up of tastes and odors and development of new tastes and odors. Also an ability to take milk, bread, meat, eggs, butter, cream and oils and to twist them first this way and then that way.

Von Noorden warns us that when we fatten a man we do not gain much for him. "We are only increasing the amount of fat in the body. Of course, proteins are well stored in the body, but even under the most favorable circumstances their amount is very small compared to the increase in fats. Moreover, it is very questionable whether the nitrogenous substances which are retained during overfeeding really produce an increase in the living protoplasm."

Diabetes.—In diabetes sugar is present in the urine. The kidneys put it there but in doing so they only did their duty. They put sugar in the urine to get it out of the blood. The essential condition in diabetes is excessive sugar in the blood. There is always sugar in the blood. The work of the body requires it. In diabetes the amount is much beyond the requirements and the kidneys eliminate the excess. The sugar is in the blood because the liver put it there.

Now we are getting back to the important causative factor in most cases of diabetes. An excessive activity of the sugar forming function of the liver is a chief feature in diabetes. The most important excitant of the sugar forming function of the liver is the carbohydrates of the food. Note that the starch and sugar eaten do not pass directly into the sugar of the blood. They stimulate the liver to make sugar, using, however, elements that they furnish. They are first torn down and then built up.

The first step then in treating diabetes is to cut down the starches and sugars—to cut out bread, potatoes, sugar and sweets of all sorts; to use only those diabetic flours that contain 20 per cent or less of starch and not to eat bread from those unless the starch has been well cooked, cooked as is the crust of the bread.

To keep this up for months is as far as many people need to go. But it cannot be kept up indefinitely. The man with diabetes burns up tissue much more rapidly than does the well man. Absolutely at rest he burns up more tissue than a healthy man digging ditches twelve hours a day. American investigators have proved those points.

This waste must be provided for. Naturally, we say increase the fat and the proteid. Give the man enough butter, cream, olive oil, cotton seed oil, butterine, lard and fat meat to compensate—which is good advice up to a certain point. The stomach will only stand for a certain amount of fat.

Naturally, also, we say give the man an excess of lean meat, gluten flour and other forms of proteid. But there a danger lies. The experi-

menters have found that proteids stimulate sugar production by the liver. Rubner tells us that in healthy people this action is slight but in diabetics it is great.

Von Noorden tells us that we must give proteins but that they must not wholly replace the carbohydrates. They must not be given in excess. He says that proteins of eggs and vegetables are better for diabetics than those of meat and milk.

He furthermore says that mixed meals should not be eaten. Where one is eating carbohydrates and proteids he should eat the carbohydrates at one meal and the proteids at another and more than two hours should intervene between the meals.

However, fats cannot carry all the load. The stomach will not stand it. His advice is to give as much fat as the stomach will stand and then to divide the balance of the requirement between starches and proteids.

After the first period of nearly complete carbohydrate starvation has been gone through with von Noorden allows his patients to increase the amount of starch and sugar taken and to decrease the amount of proteid. He thinks the meals and flours from oats are the best forms of starch. Next in order he places banana flour.

He thinks that when the amount of meat and other proteid is kept extremely low the patient can take wheat, rye and potato starch without harm.

Diseases of the Kidney.—By this name von Noorden designates the different kinds of Bright's disease. In them the kidneys are crippled. The crippled organs must be spared as much as possible. "The more protein is broken down in the body the more will the kidneys be tired out with work. The fact that medical practice has for a long time insisted on the value of a minimum intake of all forms of protein in nephritis is a special expression of the general view that damaged organs require the greatest possible amount of rest."

Chittenden of Yale has taught us that we can get along permanently on a small amount of lean meat. People with Bright's disease need some meat, milk and eggs but they do not need much. Von Noorden says that spices and all extractives should be excluded from the diet.

Everybody knows what spices are. Most will need to be told what extractives are. Extractives, roughly, are the flavors of meat. Beef tea is rich in extractives; boiled beef is poor in them. Meat soup is rich in extractives; the meat removed from the soup is poor in them. A good rich chicken soup made out of an old hen is exceedingly rich in them.

Von Noorden also lays stress upon the strain put on the kidneys by the removal of water from the blood. The practical teaching of that is that it is well for a nephritic to spend the winter in the far South where the climate is both warm and even.

The idea is that in ridding the body of the surplus water the kidneys must do what the skin fails to do. In such a climate the skin stays on its job of exuding water all the year and the kidneys are never required to carry an extra burden.

If spring waters are used the best are those with little mineral in them —the plain flat, pure waters.

Von Noorden ends his article by cautioning against stereotyped rules in

diet. What is too much for one man is not enough for another. What is food for one man is poison for another.

It is an everyday experience that hard and fast rules are laid down and carried out which only regard the name of the disease and do not take any account of the individuality of the patient.

In dieting two pairs of scales are necessary—one to weigh the subject on; one on which to weigh his food.

SCALE OF WEIGHTS

A woman 10 per cent overweight is fat. One 20 per cent overweight is obese. These statements recently appeared in a leading medical journal. To be called fat is bad enough; to be called obese is intolerable.

To reduce is not easy. Self-denial is required. Sensations unpleasant enough to be called suffering will be experienced. Something more than impulse is needed. Perhaps knowledge that one is obese may supply the necessary incentive.

The New York Life Insurance Company uses a scale of weights from which the following table is made up:

4 FEET 9 INCHES			
Age	Sex	Normal Weight	Obese if Over
20	Female	100	125
30	Female	105	131
40	Female	110	137.5
55	Female	118	147.5
20	Male	104	130
30	Male	110	137
40	Male	114	144
55	Male	117	147.5
5 FEET			
20	Female	109	138
30	Female	115	145
40	Female	121	152
55	Female	128	161
20	Male	114	145
30	Male	121	151
40	Male	125	156
55	Male	128	163
5 FEET 2 INCHES			
20	Female	116	146
30	Female	123	155
40	Female	128	162
55	Female	136	172
20	Male	122	152
30	Male	128	160
40	Male	133	167
55	Male	137	171

5 FEET 4 INCHES			
Age	Sex	Normal Weight	Obese if Over
20	Female	123	148
30	Female	129	155
40	Female	135.5	163
55	Female	145	174
20	Male	128	160
30	Male	136	170
40	Male	141	177
55	Male	145	181
5 FEET 6 INCHES			
20	Female	130	163
30	Female	136.5	171
40	Female	143	178
55	Female	153	188
20	Male	136	169
30	Male	144	176
40	Male	150	186
55	Male	154	196
5 FEET 8 INCHES			
20	Female	138	173
30	Female	145.5	182
40	Female	152.5	192
55	Female	163	204
20	Male	144	180
30	Male	153	190
40	Male	158	197
55	Male	163	205

5 FEET 10 INCHES				6 FEET			
Age	Sex	Normal Weight	Obese if Over	Age	Sex	Normal Weight	Obese if Over
20	Female	147	184	20	Female	156	195
30	Female	155	193	30	Female	164	205
40	Female	162	203	40	Female	172	212
55	Female	173	217	55	Female	183	227
20	Male	153	191	20	Male	163	204
30	Male	163	203	30	Male	172	216
40	Male	168	210	40	Male	178	224
55	Male	173	217	55	Male	183	227

A tendency to take on fat is of different significance according to age or other circumstances. It has been asserted that obese children are especially prone to develop diabetes in middle age. As will be noted from the above table there is a natural tendency to take on fat as age progresses. Between 40 and 55 years of age this is very much more marked in men than in women.

Producing this change are several factors. One is an improper relation between muscular work done and the amount and kind of food eaten. Another change is in certain internal secretion glands—the thyroid and the sex glands particularly. A third is a general tendency toward equanimity.

When senile atrophy has advanced further the tendency to obesity is replaced by a tendency toward emaciation. People who approach three score and ten will do well to forego all measures having for their end holding the fat down. After that milestone has been passed effort should be made to put on flesh.

OBESITY

In all cases obesity results from a disturbance of nutrition. Too much food of all kinds is eaten and not enough exercise is taken. The body cannot burn the food up into the final products of combustion—carbon dioxid and water. The system uses a makeshift. It converts the excess of food, particularly the starchy foods, into fat and shoves it aside into the tissues to get it out of the way.

If the food did not come in such large quantities and at such frequent intervals, if the body were given time and opportunity to oxidize the food by work, it would take the materials essentially needed, burn up the rest and not be burdened by excessive deposits of fat. Where laziness abides fat resides.

All ease and pleasure loving peoples have their pleasure spoiled by the fat accumulated. Thus obesity is met with in great frequency among the oriental and African races.

Obesity and gout are closely associated and both thrive on the same victim. Alcoholic indulgence, injury or invalidism preventing bodily exercise do their share to load the body down with fat.

Outside of "looks"—which are sometimes in and at other times out of fashion—obesity is a serious hindrance to the enjoyment and comfort of life. The internal organs all have deposits of fat that may interfere with their proper action. Shortness of breath, bronchitis, palpitation and other

functional embarrassments are occasioned. It also results in lessened instance to infection.

The prevention of obesity rests on regulation of diet, habits and exercise. No more food should be taken than can be used up by the body. An excessive diet of starch foods and malt liquors should be avoided. The real burning up of food is not accomplished in the stomach but in the lungs and muscles. They are the metabolic furnaces. Keep your lungs and muscles active.

The treatment for those who already suffer is chiefly along the above lines. The fundamental conditions should be removed. Stop feeding the trouble. The diet should be cut to at least one-half the usual amount. Fats and starches should be limited a little more than the proteids. The total elimination of fats and starches is not thought advisable. The amount of liquids should also be limited.

Indolence and disinclination to exercise should be strenuously combated. Too much sleep or idle lying abed should not be encouraged.

Invalids not able to take active exercise should practice passive movements. Frequent cold bathing by those who can tolerate it is beneficial. The skin and kidneys should be kept active. There is an anemic form of obesity that requires special treatment.

In most cases people can fight off fat if they are determined and persistent in their efforts.

FAT AS A SIGN OF AGE

The normal man is about 12 per cent fat. If a man eats each day just a little more food than he uses in his work and keeps it up he puts on fat. The amount of excess food required is slight. In certain experiments a nutritional balance was found by trial and then two slices of bread and a good sized helping of butter were added to the daily diet. This was enough to add on fifteen pounds in a year. Saundby calls obesity of this kind not abnormal but the consequence of an abnormal kind of living.

The obese people of weak constitution only get 11 per cent of useful energy out of the food they eat instead of the normal 25 per cent. We do not care much so long as we are fat and useless whether it results from abnormality of the body or an abnormal kind of living.

About the age at which occurs the change of life in women both men and women fatten up. This is the first sign of age. It is generally agreed that this change results from abnormality. Some say it is due to aged sex glands; others to aged thyroid glands; others to combinations of these; and still others to other causes.

While the scientists are arguing we may accept this as true—the man or woman in the forties or in the fifties who slowly puts on flesh, who develops the "fair round belly and good capon lined" of Shakspeare is showing the signs of age.

Of course, his mind is poorer; he tires more quickly; he cannot walk upstairs without panting; he snores because his head is filling up with fat; he is in increased danger of pneumonia and of diabetes, but that is not the point. He is showing his first sign of age. Whether it be man or

woman, it is a change of life. It is just as good a sign of advancing years as gray hairs.

It is true that all people do not fatten up; that many get busy walking, riding, playing golf, dancing, rolling ten pins and so keep the fat from accumulating. But on the other hand the hair is not an infallible sign.

This period is followed some twenty or more years later by another stage, "the lean and slippered pantaloon." In this stage the fat is continuously disappearing from all parts of the body. In consequence the skin so long stretched to cover the body hangs in loose, inelastic wrinkles.

Not only is there loss of fat until the man's body is less than 12 per cent fat but there is also a loss of water. The tissues dry out; the soft, almost gelatinous tissues harden up. This is the stage of old age accomplished.

In this stage the body works extremely economically. There is little waste. Wear progresses slowly.

In no other part of a man's career does he grow old so slowly. In no other part of his career is he as free from danger of infection and disease. With the exception of colds the body stands infection well.

HOW TO DECREASE GIRTH

The pouchy abdomen is in bad repute. It is rightly so, for, as Lydston says: "Given the firm, well developed abdominal muscle, it is hardly necessary to examine the rest of the muscular system. Any set of exercises which gives good abdominal development imparts an excellent general development. Abdominal protuberance in individuals out of condition is more apparent than real, and is due to flabbiness of the abdominal walls rather than to increase of fat or girth."

This is pretty generally recognized, and, being so, many men and women put in some time each morning rolling back and forth on the floor.

Rolling persisted in will reduce the girth—but there is a simpler way which is better in that it better builds up the abdominal muscles.

The abdomen has muscles in front which bend the body forward and others behind which bend it backward. In addition there are three sets on each side which run around from back to front—one set straight around, one set diagonally downward, one set diagonally upward. The brain has excellent control over these muscles; therefore, it is not difficult mentally to pick out the muscles of a certain part of the abdominal wall and to throw them into a state of tension.

First bend forward slowly and strainingly by making the front group outpull the back group; then backward by making the back group outpull the front group. This exercises the up and down muscles. Next, by holding the breath fix the diaphragm and then push the intestines hard against it by pulling hard on the muscles which run around the abdomen straight and diagonally. Next, while holding the abdomen against the edge of a table take a deep breath thus using the diaphragm to press the intestines against the abdominal walls.

In addition, from time to time during the day throw the abdominal muscles into a state of tension moving systematically through the lower part

right side, upper part left side and diaphragm back in the order named. This can be done without attracting any notice as one sits at his work.

A good muscular tone to the abdominal walls will decrease the girth. If the man continues to overeat he will store up fat but the abdominal tension maintained by strong muscles will drive the fat to other parts of his body. Fat makes areas soft. It also seeks out soft areas. Whenever a given area becomes a work, or strength, or tension area fat packs up its baggage and moves.

OBESITY CURES

To cure obesity is the easiest thing in the world. Practically anybody can be cured by any one else. The fattening of thin people is about as simple. There is not one person in a thousand who goes into a tuberculosis hospital while he is in the early stage but that can be fattened twenty pounds in six months.

If this can be done with tuberculous people, given the same control of mind and body, nervousness, exercise and food it can be done with well people. All this means that anybody can add to or take from his flesh if he desires it sufficiently to pay the price.

This is the method:

1. Cut down the amount of food to a point where the patient steadily loses one or two pounds a week. To limit the water drunk helps some. To limit the bread, potatoes, stuffings, pastries and alcoholics aids some. But the crux of the situation is to get a pair of scales and weigh out an amount of food that causes a loss of weight in that patient. People vary in the food which is required to fatten them just as hogs do. What would fatten one man would starve another. *Cut the amount of food low enough and the man will certainly lose weight. No man can be trusted to diet himself by guessing. The whole scheme fails unless the food is weighed.*

2. Exercise must be definitely taken. The record must show that a given amount of exercise is taken each day. Here, too, individuals differ. But the main difficulty is that the man cheats himself because he makes no definite daily record.

3. Weigh each week. The amount of clothes must be uniform. The heart of the scheme is scales. No dieting scheme without scales is worth anything. With scales any man willing to take the trouble can reduce his weight. *Any obesity cure, except that of patiently day by day earning the cure is worse than useless and is frequently harmful.* It is in this broad sense that I have written that obesity is a sign of laziness. It would have been better to have said that it is a sign of lack of control and patient determination.

GETTING THIN

Growing children seldom get enough food. Rubner, Waters and Aron have shown that full feeding will add to the stature attained by growing children. Workingmen doing hard manual labor seldom eat an excess of food. Therefore from the fat who would be healthier if thin these groups should be dropped.

Financiers, merchants, office workers, clerks, and housewives, on the other

hand, go about their duties as a class panting because they are too fat. All of them know it and some of them want to reduce.

There is some danger in reducing. The system, mechanically and chemically, has become adjusted on the basis of fat, the mind is temperamentally on that basis, the subjects usually have passed the years of elasticity—readjustment is not so easy as it once was.

But if the man has weighed the inconvenience and danger and has come to a determination to reduce—how shall he go about it? Let him begin with the following as one day's diet:

Meat—Four ounces (four cubic inches).
Egg—One.
Cereal—One plate.
Bread—Three slices.
Butter—Two helpings.
Sugar and cream in coffee.
Vegetables (except potatoes) in small quantities.
Drink water freely.
Eat fruit freely.

This total quantity should be divided into three meals. It is the starting point. The man, having weighed to begin with, should increase this quantity or decrease it until he finds the amount of food which will cause him to lose not to exceed a half pound a week in weight.

Exercise alone will not cause a loss in weight. The man who exercises has more appetite, eats more and gets fatter. But increased exercise combined with decrease of food, each change in moderation, will build up muscle and replace tissue lost as fat. A fat man has a tight skin and below it his tissues are under tension; in reducing the muscles should grow to maintain part of this tension.

Water helps the stomach to break up the food. Taken two or three hours after meals it liquefies the food and helps the stomach to empty itself. More of the nutrition of food is absorbed where the stomach's contents are well liquefied.

STRAIN OF REDUCING

Those who have an oversupply of thyroid secretion are disposed to be restless, energetic and under weight. Those who have an undersupply are slower mentally, have more poise and are disposed to be obese.

Among the first effects of the wear and tear of life is diminished secretion of the thyroid. The first sign of this diminished secretion, therefore the first indication of senility, is a tendency to obesity. Therefore obesity is an effect.

In turn it acts as a cause. On the one hand obese and overfat people not obese are less liable to be consumptive and perhaps also to disorders belonging to the worry family. On the other, they are more liable to have diabetes, pneumonia and fatty heart.

Since the obese are short-winded and indisposed to exercise and suffer from a lot of disorders due to lives of physical inactivity they generally want to reduce or think they do. The last phrase is added because at least

nine out of ten who talk about reducing have not the determination to come across.

On this feebleness of the average will the obesity cures are based. In the first place they advertise that they are easy. That appeals, for the obese want everything easy. In the second place, they figure that the fat man will quit before he finds out that he is being bunkoed, for, in the language of the political orator, each and every obesity "cure" is a fake.

There is no medicine which will reduce a person who eats when he pleases, what he pleases and as much as he pleases. The same is true of exercise methods, machine methods and every other short-cut method.

The person who has the determination needed to reduce by privation and work should not be discouraged; yet there are some facts he should know. Reducing does increase the tendency to certain conditions.

When in the reducing process the store of glycogen is drained out of the tissue the susceptibility to infections is increased. There is an increased tendency to boils and other forms of pus infection. There is an increased tendency to consumption.

The strain bears on the brain as well as the rest of the body and insanity has been known to develop. Insanity will not develop in a person of good poise but people not previously of good mental timber are liable to develop maniacal depressive forms of mental trouble. The drained out muscles record pains and cramps that are commonly described as muscular rheumatism.

There is some increase in the tendency to Bright's disease. I have seen one case of leukemia develop in a person who was reducing rapidly, and I have heard that others have seen the same sequence. The person who is reducing rapidly in winter time will suffer unduly from the cold. These drawbacks are only liable to occur during the process of reducing. The desired weight having been attained and the diet having been increased to the amount needed to maintain that weight the above dangers and inconveniences disappear.

Oertel Diet for Obesity.—*W. J. T. writes: "What is the Oertel diet for obesity and heart?"*

REPLY.—Breakfast:

One cup coffee.
Three ounces bread.

Noon:

Three and one-half ounces soup.
Lean meat roasted or boiled—seven ounces.
Fish—one ounce.
Fresh fruit—three and one-half to seven ounces.
Bread—three and one-half ounces.
Perhaps a little light wine.

Afternoon:

Coffee.
Bread—one ounce.
Water—six ounces.

Supper:

Eggs—one or two.
Meat—five ounces.

Bread—one ounce.
A bit of cheese, a little fruit salad.
Six ounces wine and four and one-half ounces water.
Oertel places great stress on exercises.

Fifty Pounds Overweight.—*Subscriber writes: "I am a young man of 23 years and a college graduate. While at college I took an active part in almost all branches of sport. Since graduating two years ago I have become stout, weighing 210 pounds. My height is five feet nine and one-fourth inches. I am still an active member of the Y. M. C. A. and also of a training club. I bowl, play baseball, handball, and medicine ball several times a week. My general condition is excellent, except that I always feel bloated, even after a light repast. I am naturally a light eater. Is there any certain diet I should follow, and if so, will you aid me?"*

Reply.—You are fifty pounds overweight. You evidently get large values out of what you eat. Probably you have intestinal fermentations by which the starches and sugars are in part converted into alcohol and gas. The alcohol easily burns into energy and that means that the other foods must be stored as fat because the tissues do not need them. People who bloat easily and have much gas are prone to become obese.

One Way of Getting Thin.—*C. E. S. writes: "I reduced my weight from 234 pounds in two years to 180 pounds. I left off taking soup and drank nothing with my meals and not for two hours after. I had been drinking from two to five glasses of water with each meal. I missed it at first, but soon forgot it and did not care for it. I soon got into the habit of drinking water after the two hours. I made no change in my diet and ate anything good that I could get, but I was careful to stop eating before I felt full. The only guide I had was that I should be hungry an hour before meal time and anxious to get to the table. If I was not hungry before meals I ate still less but always enough. I did not suffer any inconvenience and felt fine all the time. I did no hard work and did not have much exercise, being at my desk all day. But I never varied or had any lapses. I did not weigh the food and weighed myself only when it happened to be convenient, but when I did I found I was gradually dropping down. I did not make it a task and soon got into the new habit. Maybe this plan will work on other fat men. What do you think?"*

Reply.—Fifty-seven pounds in two years was reducing too fast for the average person. Cutting down the amount of water with meals cuts down the proportion of food absorbed. It works in many instances as well as it did in this. A better plan is to cut down the amount of food eaten. Your plan worked well because you stuck steadily to it. Where the average man fails in any reducing plan is that he does "vary and have lapses." Again, you scored when you "were careful to stop eating before I felt full."

Reducing Weight at 68.—*A. McK. writes: "Last July I was found to have blood pressure of 226. I am 68 years old and then weighed 204. Previous to that time (July) I had always enjoyed good health. I have been placed on diet and my weight is down to 190, blood pressure 185 at present time. I am still on diet and hope to reach 175 pounds. My height is 5 feet 8 inches, and I confine myself to sal hepatica one teaspoonful*

three times per week as a remedy. Is this sufficient? I am and have been on a vacation since July and take moderate exercise every day. What further would you suggest?"

REPLY.—I would suggest nothing except that you consume at least a year in taking off those additional pounds and, better still, that you do not take them off at all. You are at the brink of the life period when obesity naturally becomes less, when the tissues naturally shrink some and when blood pressure naturally falls somewhat. In view of this I think you had better go slow about reducing further, particularly at the rate of three pounds a month.

Cut Down Quantity of Food.—*J. S. H. writes: "I have been getting fat for the last ten years, about three pounds each year. My weight is 175 pounds, my height 5 feet 5 inches, and age 35 years. I generally walk two or three miles each day, and sometimes more, also do some exercising in the morning."*

REPLY.—You are about thirty-five pounds overweight. Walking and exercising increase your appetite. Cutting down the quantity of food is your only remedy.

Take Less Food.—*Mrs. O. M. P. writes: "I am past 30 and much overweight. My head aches much of the time. Can you suggest something that will relieve me?"*

REPLY.—Probably your obesity and your headaches are cut from the same cloth. When more food is eaten than is needed the surplus is stored as fat. Too much food and too little exercise together constitute one cause of headache.

To get relief eat less. Decrease your food until you are losing weight at the rate of one pound a week. Stick to that quantity until you get where you should be.

Reducing obesity is work. The short cuts are fads.

Reducing Weight.—*J. R. writes: "Please give me a formula for reducing weight. I am 16 years old and weigh 135 pounds. I think I am a little too heavy for my age."*

REPLY.—About the only formula worth while is to eat less and exercise more. What you eat is of little consequence. At 16 it should be easy to form habits of exercising in the open air that would keep you physically fit all the year round.

Don't Take Medicine.—*M. E. G. writes: "I am desirous of dieting in order to reduce my superfluous flesh, but find it extremely difficult to refrain from eating enough to satisfy a hearty appetite. Is there anything one can take to lessen one's appetite or relieve the pangs of hunger without, of course, in any way injuring oneself?"*

REPLY.—Poke root and iodids are sometimes taken as obesity cures. Some part of their action is because they lessen the appetite somewhat.

My advice is that you do not take either of these or any other medicine for obesity. Fill up on soup, fruit and bulky vegetables, eat sparingly of bread, potatoes, meat and milk. A small amount of food eaten slowly is as satisfying as a large amount eaten rapidly. After all is said, to reduce obesity requires persistence and "grit."

Short Cut Obesity "Cures."—*F. L. writes: "Do you consider rubber garments to reduce flesh beneficial or harmful? I refer to rubber stockings."*

Reply.—They do no good. They do some harm to the skin. Reduce your food and take more exercise. All short cut obesity cures are fakes. Rubber garments belong in the list.

Diet Held Successful.—*H. writes that using the following diet he has taken off fifty pounds in the last year. He has kept at work and felt well. For a time he would get hungry in the afternoon. When hungry he would fool his stomach with beef tea.*

The Diet.—Upon rising sip a tumbler of hot water (with a squeeze of lemon juice if you like).

Breakfast—One or two cups of coffee or tea without milk or sugar. If sweetening is required dissolve a saccharin tablet in a little water and add two gluten biscuits. Four ounces of lean broiled chops or cutlets (four ounces equals about two chops), or four ounces of broiled or boiled white fish, such as sole, cod, turbot, haddock, halibut or perch; or four ounces of lean chicken, game, or broiled kidney. (Use plain condiments as below.)

Lunch—Four ounces of lean broiled chops, steak, lean beef, mutton, chicken or game, taken hot or cold, roasted or boiled (with gravy if free from fat). Four ounces of green vegetables (given in list below). Four ounces of stewed or baked fresh fruit, such as apples, gooseberries, cherries, stewed pears, rhubarb, and the like (sweetened, if at all, with saccharin, dissolved in a little hot water). Two gluten biscuits.

Dinner—Any clear soup. Four ounces of fish (from breakfast list). Four ounces meat (from lunch list). Vegetables, stewed fruit, and salad. Two gluten biscuits. Shell fish, such as lobster, oysters, clams, and the like, may be taken at lunch or dinner.

Details of Diet.—Before retiring at night sip a tumbler of hot water. Drink freely at or between meals of plain or mineral water so as to keep the kidneys acting well. The bowels must be kept open. Take gentle exercise each day stopping short of fatigue. All beverages and stimulants containing sugar must be eliminated.

For necessary sweetening use saccharin dissolved in a little hot water. In place of bread use gluten biscuits. A cup of beef tea or strong, clear soup may be taken when liked. A cup of black sugarless coffee or sugarless tea can be taken when liked.

One need not necessarily eat all of the variety mentioned for meal if less satisfies. Do not eat potatoes, green peas, butter beans, breads, pork, fresh or dried fruit, eggs, cream or milk, or fried food. Vegetables and salads allowed: Beets, cauliflower, eggplant, spinach, carrots, mushrooms, turnips, oyster plant, squash, green beans, cabbage, artichokes, asparagus, celery, cucumbers, tomatoes, lettuce, endive, water cress, brussels sprouts, mustard and radishes. Condiments allowed: Flavoring sauce, catsup, vinegar, pepper, salt, mustard, and horseradish.

Comment.—It will be noted that this diet prescribes definite quantities and eliminates bread and starchy vegetables. The quantities may be large for some persons. If so they should eat three ounces when four is specified, or even less.

Peril in Reducing Weight.—*E. K. asks for "balanced ration" for one who has dieted, reducing forty pounds in six months, to normal weight on "greens," zwieback, and the like, omitting starches and sugars. How may one retain this weight (greatly improved physical condition also) and also have a more varied diet? Is there danger of malnutrition if one omits sugars, starches, and fats? If there is a tendency to intestinal disturbances, what diet is best for one inclined to obesity? No complications or chronic ailments except rheumatism. Age fifty.*

Of course this case is in physicians' care but general directions and advice are desired.

Reply.—I cannot send you a balanced ration in detail. You say that you are under the care of physicians and it is for them to determine what ration is best for you. However, if you have reduced forty pounds in six months you are undoubtedly eating too little. Your internal organs have all been adjusted to the presence of some fat around them. This fat must not be suddenly removed. Your skin has been adapted to cover a certain amount of volume. It is inadvisable to reduce the tension inside of your skin too rapidly. You are not justified in reducing at a more rapid rate than twenty pounds a year, and ten pounds a year would be better judgment.

If your present method of eating has reduced you forty pounds in six months it is evident that in order to make energy and heat sufficient for your needs you have had to burn up forty pounds of your fat and muscle. If you do not wish to lose more you will therefore have to increase the amount of food which you are eating.

Zwieback is nutritious but greens serve in the main as filling. However, it is not so much the things you eat as the quantity which you eat. You should therefore increase the quantity of food over that of the last six months. You will eventually suffer from malnutrition if you do not take some small quantity of meats and also sugars, starches, fats and vegetables.

How to Check Obesity.—*P. A. W. writes: "Please advise me as to a way to stall off 'getting fat.' I am a young man employed in an office, and although I get some exercise at night, am confined all day. Am now taking on weight, not solid, but flabby. More strenuous exercise doesn't seem to help me. Would a diet be effective? Also, what exercise do you recommend as most beneficial?"*

Reply.—Assuming you are increasing your weight more than three pounds a year what you need is to diet in addition to exercise. Dieting consists in reducing the amount of your food. While changing the articles so as to decrease the amount of sugar and starch is of importance the main thing is to decrease the amount you eat during the day in such a way that you will stop gaining. It is practically impossible to do this without being guided by the scale. You should weigh once every week and record your weight. I know of nothing in which people cheat themselves more than in reducing their food by guess. They cut down for a few meals and then eat enough to make up.

Reducing Weight Intelligently.—*Mrs. E. B. M. writes: "I have been following your directions for reduction of weight, and am succeeding to my own satisfaction and the astonishment of my friends. I find the amount of food you allow as reasonable is too much for me to reduce on, but I have*

easily worked out a diet for myself, which keeps me satisfied and yet allows the loss of one pound of weight a week without any injury to my health. The matter which troubles me now in hot weather is how much I ought to drink. I crave water and I wish to know if it is safe (with a view of losing weight) to drink water freely between meals if I avoid it at meal times?"

REPLY.—Water between meals can be taken freely. A moderate amount of water with meals will not increase flesh if the food is reduced in quantity. To take water with meals increases the available nutrition from the food, say 10 per cent. Therefore, when water is taken with the meal the food should be correspondingly decreased. Do not continue your present rate of reduction long. Your organs must adjust themselves to the extra room and that requires a little time. You are right in adjusting your diet to your needs. One person will fatten on what scarcely suffices for another. Wise people adapt standard diets to fit their peculiarities.

Reducing Weight Too Fast.—*C. E. E. writes: "I am a trifle less than five feet five inches in height and was 55 years old on May 10. About ten years ago I began increasing in weight. I went to 196 pounds. Late last year I decided that I ought to do something to reduce weight, and especially to overcome the tendency to increase. My health is good, I always sleep well. I use no liquor or tobacco, but use coffee, also occasionally tea. I started with two meals a day on Jan. 2. For breakfast I have bacon and eggs with rolls and coffee, for dinner, for some time, rich cream with shredded wheat biscuit and fruit, no pastry. My weight is now (June) 166, and I never felt better. Have I reduced weight too rapidly? Am I eating the proper food?"*

REPLY.—You are still a little above the proper weight for your height and age but a drop of thirty pounds in six months is going too fast. Increase the amount of your food until you stop the drop. Do not increase it enough to make you gain. Other than that, the diet is right.

Beware of Fat Reducers.—*Mrs. G. McH. writes: "Have you ever heard of the following drugs, and if you consider them dangerous to take as a fat reducer? Aromatic elixir, 5 ounces; glycol arbolene, 1 ounce. Mix and shake well and take a teaspoonful after each meal."*

REPLY.—This is an illustration of the new way of advertising a proprietary medicine. It is called the hidden "ad." No person is justified in taking any fat reducer. To decrease the amount eaten reduces fat. Medicines do not.

Water and Weight.—*H. E. B. writes: "I have not yet learned from your articles what effect six or eight glasses full of water before breakfast and two hours after eating, have upon the weight of a person. Would it make fat or flesh? I drink very little with meals, but fear I have been gaining fullness in the last month or two."*

REPLY.—First, there is a chance that it would dilate the stomach; second, it would contribute indirectly to "gaining fullness." If you wish to lose flesh reduce the quantity of your food and drink several pints of water a day but small quantities at a time, not six or eight glasses.

To Overcome Obesity.—*Subscriber writes: "Will you please let me know how to overcome obesity?"*

REPLY.—Obesity is caused when the starches and sugars taken into the body are not completely burned up. The first effort should be to limit the intake of these foods. In fact, cut down the total quantity of food. The amount of fluids should also be limited. The next thing to do is to assist the body in using up what is taken. To this end exercise—walking, riding, swimming—is of great value. Cold bathing will help some.

Reduce Your Food.—*S. F. A. writes: "I am about fifteen pounds too heavy. A friend told me I could reduce as much as I wanted to by taking a dose of sal hepatica every morning. It is reducing me nicely, but I am afraid it will leave me in a run-down condition. Can you tell me something better to take to reduce my weight?"*

REPLY.—You are not justified in cutting down your weight by producing diarrhea. Reduce your food.

To Reduce Abdomen.—*H. S. C. wants to know how to reduce an enlarged abdomen.*

REPLY.—I cannot help you but I can help you to help yourself. My part of the program is a short horse quickly curried; your part must extend through the forty-four years of your life. To speak more accurately you must keep up your efforts until you are eighty. After that age the tissues are disposed to shrink and you can let up. Enlargement of the abdomen can go on without a generalized obesity, or as a part of such condition but out of proportion to the enlargement elsewhere. We shall discuss that first.

The abdomen is held in bounds by the muscles in front and the backbone behind. The way to keep the front muscles from pouching is to make them about as strong and immovable as the bones behind. Muscle exercises to accomplish this end can be taught you by the physical director of the Y. M. C. A.

There are several factors in the accumulation of fat at fifty-six—inheritance, overeating and thyroid atrophy. Some have it "in the blood" to fatten up as they reach middle life. This means that such people must strive the harder if they would keep thin.

The thyroid gland becomes senile in many people in middle life. As this senile atrophy develops such people tend to put on fat. They get relief from small doses of thyroid—just a little, enough to supply the deficiency and, therefore, but a fraction of the several grain doses so frequently given. In taking thyroid persistently you are imitating nature but thyroid must never be taken except under medical direction, for it is too powerful to be tampered with.

Much the most important instruction is to decrease the quantity of food eaten. Whenever a man is getting fat he is eating too much and that is the main thing wrong. He may be eating like a canary, or not eating enough to keep a sparrow alive, or eating less than other people, or eating less than he formerly did—nevertheless, he is eating too much.

If his thyroid is atrophying or he is of fat stock there is all the more reason why he should adjust his food to his body and his work. The best evidence that it is not so adjusted is his increasing fat.

The right policy is a gradual reduction of the amount of food to a point where the weight remains uniform, reducing just a little lower still. A full waist line is not inevitable. Want to be slender hard enough—and stick.

Buttermilk and Weight.—*M. S. K. writes: "What effect has buttermilk on one inclined to obesity? Is it a fat producer? Is it advisable to eat dry toast with unsweetened fruit juice or tea without milk for two meals each day when attempting to reduce one's weight?"*

REPLY.—1. It is a fat producer. It is an easily digested food, having all of the advantages of sweet milk except that it is less of a heat maker (sometimes an advantage) and is usually more easily digested. If you are reducing be sparing in your use of buttermilk.

2. Yes, provided you do not eat too much toast. It is of prime importance that the quantity of food taken be reduced. What foods to take and what not to take is of secondary importance.

To Reduce Weight.—*S. D. writes: "I have a daughter 10 years of age, who weighs 145 pounds. She has been fleshy all her life, but she seems to be getting more and more so. She seems to be well in every way, and exercises as much as any child does. Is there any harmless remedy for her?"*

REPLY.—1. A girl ten years old of average height should normally weigh about sixty-five pounds. A weight of one hundred and forty-five pounds is certainly excessive. An excessive amount of sugar and starch in the food is one of the most controllable causes. A disinclination to exercise makes matters worse by failure on the part of the individual to burn up the sugars and starches.

2. The remedy for the condition lies chiefly in limiting the amount of fluids taken by promoting bodily exercise to the utmost possible extent, and by cold bathing. If this program is persistently carried out satisfactory results will be obtained in the course of time in most cases. This course of treatment is best taken under the care of a skillful physician, who can watch and regulate the diet and habits of the patient.

To Reduce Weight at 50.—*I. M. H. writes: "I am a woman of 50 years and am getting stout. I have been told to take the juice of one lemon in water before breakfast. 1. Will this reduce my weight? 2. Is it injurious to the system?"*

REPLY.—1. No.

2. No. If you want to reduce your flesh reduce your food. There is nothing to be gained by trying to short cut by using vinegar, lemon, or other cures.

Reduction of Weight.—*M. M. writes: "I was much struck by a recent article from your pen on the subject of obesity. The writer has long been afflicted with a good appetite and tendency to lay up surplus aliment in the shape of fat. Your article seemed to me so simple that it was most practical. To weigh daily and to cut one's food down in quantity, if found to be more than enough to keep one at a regular weight, appeared to me the summit of simplicity; no long list of interdicted dishes, with the consequent constant suffering from desire to eat those interdicted things, just simple abstinence in quantity. I have, in the past, had long formulas written for me by various doctors with lists of food good or bad for my constitution, and that course always seemed to me wrong in principle and to lead to an unbalanced diet, for who knows better what one needs to eat than the man himself, directed by instinct? So I resolved to try your method, and, having a set of good scales in my room, I have been testing your advice. Here is the result after eleven days' trial:*

Feb. 26 ..... weight 231 lbs., 8 oz.
Feb. 27 ..... weight 230 lbs., 8 oz.
Feb. 28 ..... weight 230 lbs.
Feb. 29 ..... weight 229 lbs.
March 1 ..... weight 228 lbs., 8 oz.
March 2 ..... weight 229 lbs.
March 3 ..... weight 229 lbs., 8 oz.
March 4 ..... weight 230 lbs.
March 5 ..... weight 229 lbs., 8 oz.
March 6 ..... weight 229 lbs., 8 oz.
March 7 ..... weight 228 lbs., 4 oz.

"This seems to me to show a proof of your statement that weight is very much a matter of eating more or less food. These figures are not anything extraordinary, as I have by no means starved and have partaken of any food that appealed to me. Only I have eaten a reduced quantity. Of course one might reduce himself a pound a day without any harm, perhaps, but I have seen so many cases where people adopted the so-called Banting system of eating no sweet or starchy foods, and wound up severely ill, that it never appealed to me. During this trial of your method I have eaten sweets and starches indiscriminately, only in reduced quantities. I feel much better already, as that sensation of fullness in the morning, on awakening, has already left me. My wind is also much improved, and the steep steps I have to climb daily to and from my office I negotiate with much less fatigue and short windedness. On March 3, by the way, I sat reading all day indoors and, instead of eating almost nothing, gave way to the usual Sunday stuff. The result shows in the weight column for two days after. The weights are taken without clothing in the morning after emptying the bladder and bowels just after rising."

Reply.—This rate of loss is a little too rapid. After your weight reaches 220 you had better reduce the loss to one pound a week until you reach 210 and arrange for a slighter weekly reduction after that.

How He Reduced Weight.—*C. Mc. writes: "I have been reading so many requests for advice on 'reducing weight' in your department that I have fancied perhaps an account of how one woman worked out your advice for herself may be interesting.*

"I am—or had been for some ten or twelve years—5 feet 3 inches tall, weight 114-116 pounds; am of large frame for my height. I have been a heavy eater all my life, because I was going on the theory that I needed lots of food to keep my strength up. Last year I had a severe illness, and when I recovered began to get fat. By Christmas I weighed 138 pounds and felt like a stuffed sausage. Stomach was upset all the time. Took any amount of medicine, but it didn't work. After Christmas I decided to try the starvation plan. I am employed all day long, so cannot get enough exercise. I eat this year at a high grade cafeteria. I began by either eating almost nothing at my evening meal or going without it. Also I cut out potatoes, bread, and pie. It was pretty hard at first, and I got hungry. My moral courage received reinforcement when Lent came, because I resolved for once to keep the rules of fasting and abstinence for my body's health as much as my soul's.

"I could not weigh my food, so I merely cut it down more and more and guessed at proper quantities. After a while I found I did not crave the heavy meals I had formerly and was feeling infinitely better. So when

Easter came and my 'Lenten discipline' was over, I found no desire to 'make up' by excess. A week ago I found I weighed 114 pounds. I feel better, work better, digest better than I have in years, so much so that I hear many remarks about my improvement in health. The only thing I am still tied to is an occasional mild laxative. The sense of control, of not being tied to the whims and vagaries of a sluggish body, of self-respect and nerve poise gained from the knowledge that I can if I will, is worth an infinite deal. About the middle of Lent I came across Courtney's 'Conquest of Nerves,' and found it helpful. I wish I had seen it a year ago."

REPLY.—This should prove a healthful experience.

Reduce Quantity of Food.—*H. I. M. writes: "If you wish to reduce your weight should you eat foods containing calories or protein? I am interested in your statements of food values."*

REPLY.—Eat food low in calories—or, to put it more simply, decrease the supply of bread, potatoes, sugar, and milk. Best of all, cut down the quantity of food eaten.

Limit to Haphazardness.—*Hotel Boarder writes: "Your suggestion that everyone who tries to become either stouter or thinner by dieting will fail unless he goes to the trouble of weighing every morsel of food he eats seems to me wholly impracticable. It is certain that few will adopt it, in any case, especially among hotel dwellers. If a man wants to increase his weight, would it not meet the case if he would begin by simply eating a little more than usual of everything he is accustomed to eat, by guess; get on a weight scale once a week or so, and keep on eating a little more and a little more until the scale showed satisfactory results? I can't see any difficulty in that, or any need whatever for spending half of one's time in making arithmetical calculations as to the exact number of grains of this, that, and the other that one has absorbed at the dining table."*

REPLY.—Theoretically your suggestion is all right. Practically, there is a limit to haphazardness beyond which not much is gained. The man who is not enough in earnest to take some trouble in his dieting does not get results. He may think he is dieting but his "fingers are crossed." Arnold's "Diet Tables" (any large book store) give approximate weights of ordinary "helpings." The limit set by these is about as far as one can go and get results.

Amount Varies for Persons.—*E. D. L. writes: "As a stout man anxious to reduce, I have been following your articles on diet with much interest. I regret, however, that they are all negative—viz.: telling what not to eat. May I suggest that you follow these articles up with one telling what to eat, as, for example, a daily menu."*

REPLY.—As to a list of things to be eaten and another not to be eaten I do not take much stock in them. As to specifying quantities for people generally that I have not much faith in. What is too much for one man is not enough for another.

Why not do the proper thing—find out what amount of food causes you to lose a pound a week and eat that amount?

Practice Is Harmful.—*M. I. writes: "A friend is taking two heaping teaspoonfuls of Epsom salts each night before retiring for the purpose of*

reducing flesh. I insist that this is harmful. Will you kindly give your opinion?"

REPLY.—You are right. The salt will lose its effect and he will be left with an intractable constipation. If he does not intend to let the excess of food absorb, why eat it?

Should Weigh 160 Pounds.—*T. P. R. asks: "What is the correct weight for a young woman 5 feet 9 inches? At one time I weighed 183 pounds, but have lost thirty pounds."*

REPLY.—You should weigh about 160 pounds.

Proper Weight.—*A. B. writes: "Will you please tell me the proper weight for a woman 43 years old, and 5 feet 4 inches tall?"*

REPLY.—135 pounds.

Keeping the Weight Down.—*E. I. W. writes: "I have been doing without sweets and starches and eating meals dry for three months to reduce weight. Have lost twenty-five pounds. Have been adding a little sweets each day for a few days and find I am gaining, although I am still eating gluten bread and keeping up the rest of diet. Will it be possible for me to get into a general diet again without losing all that I have gained?"*

REPLY.—Yes—provided you cut out some meat, milk, eggs or some other nutritious element in proportion as you add sugar. If you add sweets faster than you cut out other foods you will fatten.

Bread a Fattening Food.—*A. W. P. writes: "1. Is there any kind of bread—about three pieces a day—one can eat that will not increase one's weight? Some say white bread is the most nourishing. 2. Will half a pound of Epsom salts added to the daily warm bath help make a person thin?"*

REPLY.—1. One is about as fattening as another. Bread is the fattening food.

2. No.

HOW TO GET FAT

First—Regulate the amount of food.

Second—Regulate the amount of work—worry is work.

A fat animal is one out of nutritional balance on the plus side—one which eats and assimilates more food than is required to supply energy and repair waste for and incident to the work which it does. The individual who thus gets out of balance may have at first a series of diarrhea spells—nature trying to get rid of the surplus—but presently the machinery settles down into a routine of storing the excess—at first in the areas of low pressure and later any and everywhere.

This storing is only an exaggeration of a normal process. Some fat around the eyeballs, some under the skin rounding out the angles, some under the bones of the feet to soften the jar, some here and there for special purpose, is natural.

As the excess of food over work persists there is labored breathing—an

effort to burn up the surplus—kidney and liver strain, in an effort to unload, perhaps migraine. The fat man then has an increased danger from heart disease, kidney disease, sudden death and, above all, pneumonia. On the other hand life insurance tables show that the fat man is less liable to consumption. General belief is that he is cheerier, happier, and worries but little.

If a man having weighed the arguments for and against obesity wants to get fat or fatter, how shall he proceed?

First—Limit his work, and particularly his worry.

Second—Leave his work where it is, but increase his food.

As a starter he should take in the twenty-four hours about the following articles and quantities:

Meat—Five ounces (five cubic inches).	Potatoes—Four ounces.
Milk—Three pints.	Butter—Six servings.
Egg—One.	Bread—Half a loaf.
Cereal—One plateful.	Dessert—One helping.

A way to divide this is as follows:

BREAKFAST

Coffee—One pint, with milk and sugar.	Egg—One.
Bread—Three slices.	Fruit.
Butter—Three helpings.	

LUNCH

Meat—Two ounces (two cubic inches).	Pudding—Five ounces.
Fish—Two ounces.	Butter—One helping.
Bread—Two slices.	Cheese—One-fourth pound.
Vegetables.	Milk—Eight ounces.

SUPPER

The same as lunch.

He should gain not to exceed one pound a week. If he is gaining more than this he should decrease his food. If he gains less he can increase it.

He should be temperate in gaining. He will be a chump if he works his kidneys to pieces or "pants like a porpoise" just to get some extra fat on his frame.

Weight Gaining Foods.—*H. L. B. writes: "1. I am twenty-five years old, 5 feet 6 inches tall, and weigh 140 pounds stripped. Do you think this underweight?*

"2. I drink at least two cups of beef bouillon and one glass of buttermilk a day. Will that help me gain in weight?

"3. Will patent foods guaranteed to put on weight do the work?"

REPLY.—1. No.

2. The buttermilk will, the bouillon will not.

3. No. The best foods to put on weight are milk, meat, and bread. The best of the advertised foods, pound for pound, are on a par with milk, dried milk or other milk products. Most of them cost so much that none but millionaires can afford to eat pounds enough a day to help much.

Would Gain Flesh.—*W. K. R. writes: "Will two tablespoonfuls of olive oil taken upon arising and two upon retiring cause a person to gain flesh?"*

Reply.—Four tablespoonfuls of olive oil contains about 600 calories—about as much as three-quarters of a pint of cream. Olive oil is principally used by the body to make heat. Nevertheless, if a man were eating about enough food to repair wear and to take care of his needs and to that amount were to add four tablespoonfuls of olive oil a day he would gain flesh slowly.

To Increase Weight.—*A. P. writes: "I am 17 years of age, and weigh about 110 pounds. What is the best kind of exercise and the best food to increase my weight?"*

Reply.—1. The best kind of exercise is some form of competitive sport in the open air. Play football until Thanksgiving. Play in some convenient park playground or Y. M. C. A. until very cold weather. Skate as soon as the season comes. The best kind of food is meat, bread, milk, vegetables, and fruit. Don't waste time on diets. Eat plenty of plain, wholesome, nutritious food. The point is to eat enough.

Weight Is Too Low.—*Brevoort writes: "1. Is a weight of 145 below the average for a height of 5 feet 11 inches? 2. At the age of 35 years what can be done to increase weight? 3. Is wine after eating of benefit?"*

Reply.—1. The proper weight for a man of that age and height is 170 pounds. You are 15 per cent below on the Nylic scale. 2. Eat more; worry less. 3. No.

Will Make One Fat.—*F. C. H. writes: "Will the drinking of buttermilk make a person fat?"*

Reply.—Yes, if enough is used.

How to Increase Weight.—*D. C. A. writes: "My appetite is good. I eat three good meals a day. I am very thin and pale; haven't the energy it seems to me I should have. I have been told by physicians time and again that my food does not assimilate. What do they mean by it?"*

Reply.—Food in being built into tissue undergoes the following—mastication, digestion, absorption, assimilation, the last being the final step in tissue building. If you are in good health you can put on flesh if you want to bad enough.

First—Do not fret or worry.

Second—Weigh your food.

Third—Increase the quantity of milk, buttermilk, eggs and bread until you commence fattening at the rate of one pound a week. Keep this up until you are satisfied.

Milk to Increase Weight.—*H. F. B. writes: "I drink an average of one-half pint of milk and eat about same amount of ice cream a day. Would that help me gain in weight? If not, what do you advise to use to gain at least thirty pounds of good solid flesh?"*

Reply.—It will help but it is not enough. Eat plenty of meat, bread, vegetables and fruit and drink several pints of milk in addition. At least a pint a day should be taken. A quart will be more satisfactory.

Eggs to Increase Weight.—*M. M. writes: "Do you advise my taking raw eggs—six daily—in an effort to gain in weight?"*

REPLY.—It will help but you should take an abundance of milk, bread, meat, and vegetables in addition.

Below Normal Weight.—*T. writes: "1. I am 5 feet 9 inches tall and weigh but 132 pounds. 2. Will drinking one pint of buttermilk a day increase my weight? 3. Is buttermilk better than sweet milk? 4. Is there any danger of contracting disease from fresh buttermilk?"*

REPLY.—1. Your proper weight is 148 pounds. You are 8 per cent underweight on the Nylic scale.

2. No, you need more than that.

3. Not quite so good.

4. Depends on the buttermilk. Some is safe, some not. It averages safer than sweet milk.

How to Get Fat.—*F. L. B. writes: "1. I am trying to take on weight. Would you kindly advise me on that point? 2. Are the following good: Eating of fats, (3) drinking lots of water and milk, (4) bathing a lot, running quite a bit, and boxing?"*

REPLY.—1. Eating abundantly of all kinds of food is good. Starches and sugars are more effective than fats.

2. Yes.

3 and 4. Of no special service.

To get fat:

Do not worry or fret.
Eat more than you need.
Eat heavy suppers.
Sleep more than eight hours.

Eat More; Sleep Long.—*H. P. W. writes: "Being 6 feet 2 inches and weighing but 165, I should like to increase my weight a little, if it can be done with no detrimental effects. I have been advised to use three grain hyponuclane capsules, and I wish to inquire if they are the proper thing. What constitutes an adult's dose and with what frequency should they be taken? What is their approximate cost?"*

REPLY.—You should not depend on any sort of medicine to fatten you any more than you should depend on crutches to win you a foot race. To get fat, eat more than you need, keep quiet, do not worry, be regular in your habits and sleep long hours. Eat supper and go to sleep shortly after. You know how we turn the trick with animals. Follow the same plan.

In Need of More Fat.—*A. S. weighs 140 pounds, is 5 feet 10 inches high, and 30 years old. He takes a teaspoonful of olive oil twice a day. Will this do any good?*

REPLY.—You are about twenty pounds underweight. A teaspoonful of olive oil contains 60 calories—not enough to be of any service though it is good as far as it goes.

Should Increase Diet.—*C. B. P. writes: "I am nearly 60 years of age, 5 feet 9 inches in height, and until a couple of years ago weighed 145 pounds. But I only weigh about 135 now. My general health is fairly*

good. Lately I have been drinking a cup of hot milk before meals. Could you suggest a line of food that would tend to fatten me up?"

REPLY.—You are twenty-five pounds underweight. Hot milk before meals is excellent. Increase your diet still further. If you are organically sound you can gain some weight.

How to Gain.—*E. J. A. writes: "I am 23 years of age and weigh 110 pounds. I have a great fondness for stewed apples, cake and milk. 1. I don't think apples cooked in this way have any fattening tendencies, but would like to know whether or not they are injurious. I work at night, and when I reach home about 4 a. m. I eat a big dish of stewed apples, several pieces of sponge cake and a couple of glasses of milk. Then I go to bed and don't arise until 12 or 1 o'clock. 2. I have heard eating just before retiring is injurious, but suffer no ill effects. I don't seem to fatten up any. 3. Could you tell me what I should or should not do in order to flesh up a bit?"*

REPLY.—1. They are not injurious.

2. Eating before you retire will not hurt you.

3. You do not say what you eat besides stewed apples, cake, and milk. If this is all you eat you need bread, meat, and vegetables. If you will eat enough plain, solid food, drink enough milk, sleep enough, and keep calm you will put on weight.

Worry and Weight.—*A. Z. writes: "About a year ago I worried a great deal over domestic troubles which I think caused me to lose ten pounds of my weight, making me look thin. The cause of my worry has been removed for some time, but I have not gained a pound. What can I do to gain weight?"*

REPLY.—If you have quit worrying your task is easy. Add food to your present dietary until you eat enough to fatten you half a pound a week. Continue on that ration until you have got back the ten pounds. Increase particularly in your use of milk, buttermilk, cream, cheese, eggs, bread and sweets. Drink plenty of water.

Would Lay on Fat.—*A. W. writes that he and his wife had a breakfast consisting of the following: Four pieces of toast, two cups of coffee, one-sixth pound of cheese, one egg, four pats of butter, four heaping teaspoonfuls sugar, two ounces and a half 18 per cent cream, two teaspoonfuls orange marmalade. He wants to know whether three meals similar in food value would be too much for a man, who does office work, and his wife, who has light household duties.*

REPLY.—This figures out 1,600 calories and 795 grains of protein. Three such meals would be about 10 per cent too much. You would lay on fat on such a diet.

Properties of Peanut Butter.—*J. F. F. writes: "1. What properties as a flesh builder has pure peanut butter? 2. Would the consumption of, say, ten pounds in five weeks have a tendency to increase the weight of a very thin person?"*

REPLY.—1. Peanuts run about 1,500 grains of protein and 2,200 calories to the pound. They are better at making heat than making flesh but they are good for both.

2. Yes. Enough other food being eaten.

CHAPTER XL

The Skin

The human body is in touch with its surroundings through the skin which covers it externally and lines its cavities internally. These two sets of structures at places merge into each other. They are built alike in some ways and have work to do which in some particulars is similar. The linings are delicate, easily wounded and can only work when things are about right. The skin is tough, hard to hurt and adjusts itself to widely varying conditions. The linings to work well must be bathed in moisture.

There are those who believe that the reason for so much pneumonia, consumption, and colds is that the lining of the lungs works in air which, though moist, is a dryer medium than lining membranes work well in. Compare the lung conditions with the variable conditions under which the skin works—in contact with air sometimes wet and sometimes dry, sometimes hot and sometimes cold, sometimes light and sometimes dark. If the skin were at all delicate or had delicate work to do it could not adapt itself to all these changes.

The reason for the toughness of the skin is in its structure. It is composed of a true skin and over this a covering of epithelial cells called the epidermis. The bottom layers are live cells and the outer layers are dead. Dead cells are being constantly shed from the surface and in turn replenished from the underlying live ones. The blood vessels and the nerves are below the epidermis, which means that they are several layers below the surface. Were it not for this blood would ooze out on the surface and sensitive nerves would make life unbearable. It is the dead layer which distinguishes skin from lining membranes, and this dead structure is just as useful as any other, or maybe more so.

Out of the dead layer are developed the hairs and nails—each formed for a special purpose. The nails are of service in protecting the ends of the fingers and toes. The more we use them the better the nails. Our custom now is always to protect the toes and seldom to use them and in consequence the toenails, and, in fact, the toes, are disappearing. The only toe now having a nail of any consequence is the big toe. To the contrary horny masses called corns are becoming universal. We are shedding the nails from the old places and developing pseudo nails at new ones.

The hair is for the purpose of keeping the body warm. The fur of wild animals in the far north is heavier, better and more valuable than that of the same species in the south. A few years ago a number of monkeys in Lincoln Park were kept out all winter. By spring they were heavily furred.

In human beings the growth of hair has practically disappeared from all parts of the body except those which are habitually uncovered, and it is

gradually disappearing from these, largely because it is becoming unnecessary. With the hair as well as with the nails, and with everything else, nature takes from us through disease or heredity or some other agency those things of which we make no use. *Any policy which makes for thin, pink, pretty nails will make for poor nails after a few generations, though good finger nails will persist for a few centuries after toenails have gone.* If we are not to become a hairless race we must give more thought and care to conservation of the hair.

Just as the dead layers of the skin pile up to protect the underlying nerves, so there are layers of pigment in the skin which prevent the underlying tissues from the hurt of light. The difference between the white, yellow, red and black man lies in the skin pigment. Too much sunshine may be just enough for some things but not for the tissues below the skin. *Wherever races are subject to much sunlight their complexions gradually darken. It is held that the negro is black because as a race he developed in the tropics.*

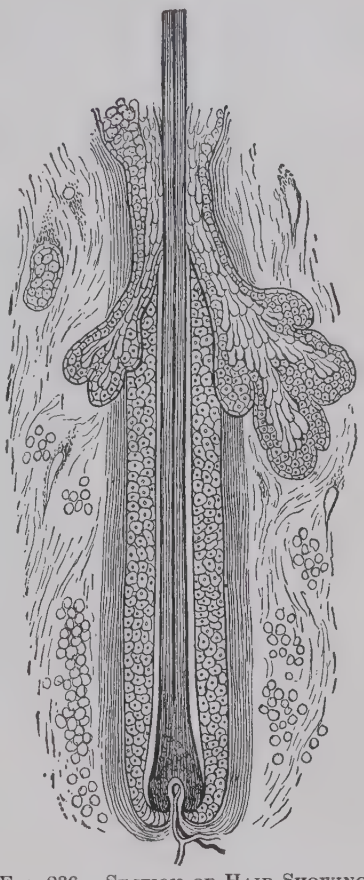


Fig. 236.—Section of Hair Showing the Epithelial Cells Which Produce It and Sebaceous Glands.

In an interesting book entitled "Effects of Tropical Light on White Men," Dr. Woodruff of the United States Army argues that acclimatization of the white men to tropical light with its abundance of short actinic rays will require many generations and it will not come about until they have developed skin pigment to protect the underlying organs. In the interim they should protect their tissues from the harmful rays by wearing black or yellow underclothing and white, gray or yellow top clothes. Black should be worn by those who work in the shade. Helmets lined with tinfoil and with wide brims are needful. White men in the tropics should rest at midday.

There are those who argue that in the end those who live out of doors will survive in the struggle for the survival of the fittest; that for survival out of doors the darker people are better fitted than the lighter. Therefore, the darker races will survive, the blondes—the fair haired—will pass away. The people of the world will all eventually be black, or at least dark.

The other side argues as follows: The light races live in cold climates. No structure is in contact with the cold except the skin. Cold applied to the skin—for example, cold air on a cold day—makes the man, woman, and child eat more food, causes the tissues to burn up better, causes the life fires to burn brighter and hotter. This, secondarily, means greater mental

activity, greater physical stature, more physical force, more energy and more stamina—and that these are the qualities that determine which people are to survive.

The first group says the American people in conquering the diseases and controlling the parasites of the tropics have made it possible for the darker people of the tropics to do more work proportionate to needs than the lighter people and therefore in another generation they will be outstripping them. To which the second group says that such people will always be runty physically and *"dolce far niente"* mentally because they lack the stimulus of cold air against the skin.

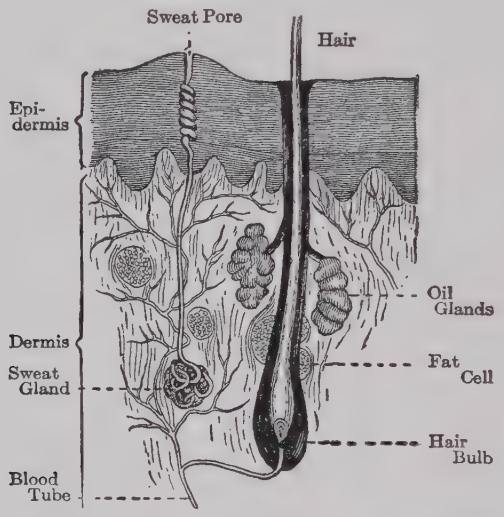


FIG. 237.—SECTION OF SKIN SHOWING HAIR, SEBACEOUS GLAND, SWEAT GLAND AND BLOOD VESSELS.

Whether the one or the other is right, it is interesting that the skin is to settle the question.

Attached to the skin, or rather developing from it and a part of it, are two sets of glands—those that make sweat and those that make grease.

The sweat is water and a little salt. Its only work is to help the skin to get rid of the body heat. When scores of tissues are making heat and but one is getting rid of it, that one needs help. The sweat glands with their secretion, sweat, are doing a body service much in excess of that of the nails, hair or pigment.

The skin having as one of its uses the protection of the body against cold, it follows that one of its uses is to get rid of heat. We cannot live or move, digest or think without making heat. Every tissue in the body is engaged in making heat while but two, the lungs and skin, are engaged in getting rid of it. In animals covered by hair the lungs have most of the work to do. In consequence a dog or chicken breathes faster and harder, pants more when exercising or hot, than does a man whose skin does most of the work.

The blood brings the heat to the under surface of the skin and the air absorbs it from the outer surface. But more important, the sweat glands pour out warm water—sweat—by the pint and this evaporating liquid chills and cools. When much heat is made the sweat glands pour out much heat. When little heat is made the skin muscles shrivel and pucker the skin—goose flesh—and close the pores of the sweat glands while the little muscles in the blood vessel walls contract and press most of the blood away from the surface and into the deeper tissues.

The grease glands furnish grease to keep the skin soft and pliable and to keep the hair in good condition. In those parts of the body where there are no hairs there are no grease glands—the palms of the hands and the soles of the feet. Their usual location is at the hair roots. So important is grease for the well being of the hair that heavily covered animals usually have large accessory oil glands and with this oil they oil themselves. When you see a duck reaching with his bill to a point on his back and then grooming his feathers you may know what he is up to.

A dry skin cracks, fissures and breaks easily. The grease glands in keeping the skin pliable and soft really help it in the doing of its work. On the other hand people want to keep their hair as long as they can. More people are interested in the grease glands and their help in preventing baldness than in their other uses. The hair may be useless. It may have nothing to do with the really important work of the skin but just the same men and women want to keep it although they generally discover their interest when it is too late.

The skin, having some contact with the blood, is occasionally the seat of disease due to bacteria thrown out by the blood. This is the probable explanation of the eruptions of typhoid fever, smallpox, and scarlet fever. More frequently the skin is the seat of eruptions caused by chemical poisons in the blood which act either on the skin itself or on the nerves. Such is the explanation of eczema, urticaria, wheals, herpes, shingles, food and drug eruptions.

The idea that most of the skin diseases are venereal in origin is erroneous. Of the three such diseases two do not affect the skin and the third does not affect it in all of its stages. Skin diseases usually are due either to local conditions or else to digestive disturbance. Skin eruptions do mean bad digestion, overeating, fast eating or constipation. They come from those gouty conditions which result from a man's eating one dollar's worth of food and doing two cents' worth of physical labor.

As a general rule the skin diseases due to so-called impurities of the blood are caused by the germ of the skin. Against these the dead layer stands like a stone wall. A germ stands a slim chance of getting through so long as that dead wall is there. Once it is brushed off enough to cause oozing any germ which falls can go through.

This dead wall also stands as a barrier against the entrance or the exit of anything. Through it neither flesh foods, foods, fats, medicines nor drugs—nothing, passes in. Through it nothing from the interior passes out. The only gates in or out through it are the pores of the sweat and grease glands. A few bacteria go into the grease glands and make pimples, a few infect the hair roots and make boils, a few hookworm parasites get in and

cause hookworm disease. The barrier occasionally fails; generally it does its work well. It protects, it works hard to get rid of heat made in excess, to shield the underlying tissues against heat, cold and light.

It wears out its life trying to adapt itself to temperature, to wind, to weather. It sometimes has diseases, sometimes spreads disease to the underlying tissues; more frequently it receives diseases from them. It is more sinned against than sinning.

SKIN TAN

There are skins which naturally are thick and oily and others which are thin and dry. The condition of the skin is the result of environment. A woman out in the sun and wind a great deal must expect her skin to tan. If she is in the dark and behind walls all of the time she must expect it to be soft and white.

The object of the skin is to furnish protection to the underlying tissues. If the light is bright the deeper layers of skin will pick up an increasing amount of pigment so as to let less light through into the underlying organs.

An albino is a person born without pigment, or with very little. It is deficient in the hair, the eyes, the skin. All of the light which strikes him leaks through into his underlying tissues and to him the daylight is as painful as it is to an owl.

Sunshine is a good thing for a human being but too much of it is bad for him and even a moderate amount is bad for his skin. Basking in the sunshine can be overdone, however pleasant it may be. When a tubercle bacillus or the diphtheria germ tries it death follows in about seven minutes. In order that he may indulge, the turtle must grow a thick shell, the man must plant trees, build roofs, provide broad-brimmed hats and accumulate pigment.

As life in the open air is necessary for health a white, pliable skin is proof that the owner is leading an unnatural and in the end an unhealthy life. Tan, and sometimes freckles, indicate that the owner is leading a life which is good for the body as a whole but is bad for the skin.

This should be kept clearly in mind: It is the exercise and the open air which does the good, and the strong sunlight is of secondary importance, in fact, is to be guarded against as much as is compatible with exercise and air. *Lying around on the beach loafing and tanning scarcely gains enough good to offset its harm.*

About the same conclusions apply to the wind's tanning. The winds of a dry country make the skin brown and leathery. The moving, hot, dry air must have water and it takes it from the skin. The climatic condition which makes so much for improvement in tuberculosis of the lungs is harmful to the skin. On the other hand, exercise in the open air on a wet day does not harm the skin. The exercise makes heat, the hot blood is sent to the skin to be rid of its heat, the sweat glands pour out sweat but the rain and snow have filled the air with moisture and the skin is not dried out or tanned or mummified.

The point to this article is that the skin is for the purpose of protection. It has work to do. The things that are good for us such as open air and a

moderate amount of sunshine are bad for our skins. If a woman wants a lily-white or house complexion she must stay in the house. On the other hand staying in the house makes her liable to get fat and flabby and to develop indigestion from which a bad skin results, so that in the long run nothing much is gained for the skin. A woman with a white skin will sometimes be ahead at thirty but not frequently; after that she is pretty certain to be a loser and what woman wants to lose out at thirty?

SPARE YOUR SKIN

Tanning is a process by which the skin protects the underlying tissues from the effects of light. This is accomplished by the development of a heavier pigment layer. The point to keep clearly in mind is that violent light is a harming agent. If the skin covering does not stop the work of this agent the underlying tissues are harmed; if the skin stops it, the skin is harmed; the tissues below are spared. If the skin is much hurt it blisters, swells, becomes edematous. If less so, it becomes red and sore and eventually peels. If still less so, it tans.

Pusey says: "As a result of long continued tanning and other results of the action of light, very positive deterioration in the skin occurs. It is due very largely to the effects of light that the skin of the hands and face shows those changes which we recognize as those of increasing years."

This does not mean that people should not go in swimming, or lie on the beach, or fish, or hunt. It does mean that they should try to avoid being sunburned and tanned. Of course, there is no justification for sun blistering. Such an excess limits the pleasure of the outing and gains nothing. But if tanning is brought about so gradually that the skin does not get sore it stops the light rays and makes one better able to stand the sun glare.

The skin is harmed but the individual gains enough to compensate. To lie around on the beach just to tan is foolish. To tan as a means of increasing the pleasure of the out of doors is usually justified. The prospective resorter might well begin gradual tanning before he goes away. After going it is well so to regulate the daily exposure that the skin does not get sore.

Nothing is gained by going bareheaded and exposing unnecessary parts of the skin. Tanning as a means in a given case may be justified; tanning as an end is never justified.

Going bareheaded, exposing the head to the heat and light in summer, is not good for the hair. It is possible that it may do no harm, and may even do good in the winter, spring and fall; but the conditions are different in summer.

Baldness is a senility change. It may be contributed to by dandruff, by disease and by bacteria. It may be in advance of and apart from general senility. A man may be old in the hair but not demonstrably old elsewhere. As Pusey says, "Too much sunlight assists in bringing about senile changes in the skin. The hair is a part of the skin. Exposure of the bare head to the glaring sunlight in summer is more apt to cause than to prevent baldness."

THE SKIN AND BATHING

The skin consists of two layers—the true skin and the outer skin or cuticle. In the skin are millions of oil and sweat glands which empty their contents on the surface of the skin, hair follicles and hair. There are also numerous blood vessels—veins and arteries and nerves.

In that great expanse of skin are a multitude of nerves sensitive to heat and cold and a wilderness of thin-walled blood vessels filled with blood.

To make use of warm water and soap baths for cleansing purposes is well enough. To fail to use baths for their effect on that great expanse of nerves and also for their effect on the great volume of blood contained in the skin capillaries is to neglect a great resource.

The skin grows from below. The old cells are pushed to the outside by the young ones. As they move out they die. The dead cells are finally pushed to the surface where they lie mixed with grease, sweat from the sweat glands, and the bacteria of decomposition. This decomposing mass must be removed; else the products of decomposition irritate the cells beneath.

The cleansing bath being for the purpose of removing dirt from the ducts of the sweat and grease glands as well as from the surface, the water should be warm enough to cause the small skin muscles to relax and to cause perspiration and grease to pour out of the gland ducts washing out the dirt and bacteria.

If the person is prone to bath itch a less thorough removal of the dead layers will bare the sensitive nerves less and is therefore better. In such people the cleanliness bath can be overdone.

The morning cold bath is in no sense a cleansing bath. Its purpose is to get an effect on the skin nerves and blood vessels. It is a nerve treatment rather than a bath. It consists of a few minutes of exercise to start the heart to pumping harder, then a few seconds of exposure to cold. When the exposure comes, whether it be through cold water or cold air, the skin muscles contract and the skin blood vessels are in great measure emptied. Then follows the rub and the exercise whereupon the blood courses through the dilated capillaries, and the skin muscles become relaxed.

A cold bath is a stimulant, a tonic, and a preventive of cold feet, if the person is able to get up a good reaction. Unless the afterglow is good, the cold bath does no good.

The warm bath without soap soothes and calms. It induces sleep. It is good for insomnia, for mental tension, for conditions bordering on delirium.

A warm bath should be continued more than fifteen minutes. In hydropathic establishments they have baths so arranged that the disturbed person stays continuously in the bath for hours, even days.

To get at the nerves various methods of giving local baths have been devised. Such are sitz baths, hot foot baths and wet packs. To get at the nerves of a part by a hot or a cold bath is better than to do it by taking medicine out of a bottle.

PIMPLES

We say that any consumptive whose disease is inactive can be made to put on fat, from which we argue that if a well man does not fatten it is because he will not take the trouble.

If a prize fighter stripped for battle were to show a back and face full of pimples he would be booted out of the ring. Prize fighters are thick-skinned, full-habited and right at the pimple age. What is the secret?

1. They exercise violently every day and make much heat; in order to get rid of it their skin blood vessels carry a great deal of blood, their sweat glands pour out a great deal of sweat and their grease glands secrete much grease.

2. They keep the quantity of their food in some relation to their work. They eat a great deal but they work a great deal. Ninety-nine times out of a hundred they are losing weight which means that, however much they may be eating, they are in need of more fuel and in consequence they burn up some of the fat of their bodies.

3. They keep their skins very clean. The openings of their grease glands are not plugged up by dirt or scarf skin. Incidentally, I imagine blackheads are squeezed out wherever found.

To sum up—the prize fighter takes the trouble to be rid of his pimples. There would be no money in his business for him if he went around, instead, asking for help—lying down on the job.

It is reasonable to conclude that every case of pimples or ordinary acne would be cured by following the same program. Some persons with thick, greasy skins very susceptible to local pus infection may have to play out the string. Others may not have to go to so much trouble.

But everyone who wishes to be cured of pimples should begin at the beginning and keep on going until results are had. Those subject to pimples must either be troubled with them or take the trouble to cure them.

There is a relationship between the skin and the digestion and assimilation. When the skin is being kept properly clean and pimples persist the cause is to be sought in disturbance of the stomach or intestines or both. That contributing cause is frequently chronic constipation. Almost as frequently it is overeating. Often it is one of those stomach conditions that we lump together and loosely call dyspepsia.

But this does not alter the original statement—most cases of stomach trouble will yield to a sensibly restricted diet; nearly all cases of constipation to a proper diet.

ECZEMA

If one turns to a medical dictionary for the meaning of eczema he finds salt rheum and tetter given as synonyms and then follows a definition which allows room for almost every skin disease. Stedman's dictionary gives twenty different kinds of eczema.

Now it is a well recognized fact that where there are many cures for a disease there are no cures. Nature and nursing do the curing, sometimes aided by the cure, sometimes hindered by it.

Whenever one finds a shotgun disease he is not dealing with one disease, but with a group. For instance, whenever catarrh is spoken of any one of a dozen conditions may be meant. It follows that there is no catarrh and there are no "catarrh cures," advertisements to the contrary, notwithstanding.

There are scores of diseases called eczema and scores of eczema cures. Occasionally somebody having a particular kind of skin disease and calling it eczema happening to hit upon a cure for his particular disease can thank his stars for his luck is with him. He has won in playing a game where the odds were as much against him as in keno.

There is no clear cut disease known as eczema, though there is a certain group of skin changes that are known as eczematous and often as eczema. Eczema is a condition in which there is inflammation of the skin characterized by something wrong in the dead layer. This layer breaks up into a soapy, greasy mass or it macerates and falls away exposing sensitive nerves and allowing some of the tissue juices to ooze through.

But however striking the skin changes may be the trouble lies back of there. The skin is the telephone bell which rings to announce a condition at the other end of the line. The bell rings in the skin but the impulse which rings it and the cause which talks are elsewhere. If the bell were not there then it could not ring—the skin is a contributing factor—but the battery, the initiative, the starting cause is elsewhere.

Eczema on a baby's head calls for just enough local treatment to prevent local aggravation. The fundamental treatment is to be directed toward the baby's digestion and nourishment. The same is true of eczema in grown people. As much local treatment should be given as is necessary to prevent local aggravation. In so far as possible the unduly exposed cells of the true skin must be protected from being harmed by maceration, by absorption, rancid fats, decomposition or bacteria, or by irritation of the nerves. But these are of secondary importance. The essential is to remove the basic trouble—the constipation, the gout, the indigestion, the perverted chemistry, the wrong habits, the nervous basis.

Almost without exception the doctor who takes off his coat and digs will find a cause for a case of eczema and almost without exception the patient who carries out directions persistently enough will be cured.

But to say "over and over the story ending as he began"—it is not a blood disease.

ECZEMA IN BABIES

There are three kinds of eczema in nursing babies. One is a dry, scaling, itching eczema, principally on the chest. This condition is found in thin, scrawny, under-nourished children. When such children are fattened up and proper attention paid to their diet the itching passes away.

The second is an ordinary eczema of face and head in fat babies. While local applications of salves may be of some service the keynote of treatment is to change the food. Generally the trouble with the food is that it contains too much fat. Speaking generally, also, the indication is for a food containing a low percentage of fat with some increase in the amount of starch and sugar to offset the decrease in fat.

The third variety is allied to the second. It is what is known as tetter or milk eczema. The cheeks are very red and sometimes chapped. Somewhere on the skin, usually on the head, there are curdy patches.

Dr. Grulee tells us that there are two often overlooked skin appearances which are due to a mild grade of eczema. When they are recognized for what they are and the food changed to what it should be these cases can be halted before they develop.

One is that of the red cheeks slightly roughened and a bit chapped, to which allusion has already been made. The other is a yellowish gray patch on the top of the head near the soft spot—the cradle cap. These patches are usually thought to be dirt and are treated as such until the disease develops into a full blown case of tetter.

These children have other peculiarities. They are prone to constipation. This constipation persists as long as the food is rich in fat. The weight curve is peculiar. Generally these children are fat but they are apt to stop gaining weight for a while, and then to shoot up rapidly for a while followed by another stop.

They digest gruels well. They are free from tendency to diarrhea. The tongue is apt to be white in spots. There is a great tendency to colds, coughs and croups. Children a little older are very apt to develop enlarged tonsils and adenoids. They are nervous and susceptible to contagion.

What is to be done with these children? First of all, and very much the most important, the diet must be changed. In babies the fat in the milk must be reduced to the minimum. To offset it the starch and sugar must be increased.

These babies are able to digest well-prepared starch by the third month. They can take malt food from the second week; as they get a little older, vegetables and gruels, fruit and meat juices can be taken. Cod liver oil agrees with these children better than cream. They must be kept in the open air as much as possible. They must be wrapped well and kept warm in winter; in summer they must be kept cool.

DISEASES WHICH SHOW THEMSELVES IN THE SKIN

A dry goods store which had no show window or did no display advertising would not interest many people. The skin is the show window, the display ad. page of many internal conditions. Not every man knows a bargain when he sees it in the window or reads about it in the advertisements. Men vary in the skill with which they read what the skin tells of conditions within.

Not every store uses its window display to best advantage. Not every disease paints a skin picture. Of those that do, not every one tells a clear cut, definite story.

Following are some of the physical conditions that display their wares in the skin show window: A bronzing means that 'way off yonder in the adrenal glands tubercle bacilli are destroying tissue. Sunburning of the hands, face, and chest when there has not been exposure to the sun means that somewhere, in some internal organ, the cause of pellagra is operating.

In the deeper layers of the skin are blood vessels and the blood in these determines whether the skin is pink or pale. A thin skin allows the blood to show through easily and a thick one poorly; but the human skin is never so thick but that tint is given to it by the blood. If the blood is rich or there is much blood the skin is pink and ruddy. On the other hand, poor blood or little of it in the skin results in pallor.

A pale, white skin means anemia due to poor blood making or excessive blood breaking. A faint lemon hue means that somewhere in the tissues blood is being excessively destroyed and pernicious anemia is resulting. A marked yellow means that bile instead of flowing where it is needed is being poured into the blood.

Pimples and boils mean that the germs which naturally lie quiet and inoffensive on the skin are traveling down the grease glands and hairs into the deeper layers—part of the responsibility for which lies in the skin itself and part in the chemistry of the body. Carbuncles mean that ordinary surface germs have traveled still deeper. Not infrequently back of the carbuncle lies diabetes, a profound change in the chemistry of the body.

Physicians diagnose scarlet fever and measles by the "looks" of the skin. Often they prognose in the same way. These infections enter through the throat and the skin manifestation is by no means the only one. Any observer can see that the inside of the mouth also breaks out. It is reasonable to conclude that the inside linings are in much the same condition as the skin.

The hair falls out after typhoid as well as several other profound poisonings. On the other hand, in some cancers and other diseases profoundly affecting nutrition the skin becomes covered with a fine growth of hair—witness the poor, weazened, down-covered babies who have survived months of summer complaint.

Finally, the red-veined and often bulbous nose, often called "whisky nose," means protracted indigestion. If a whisky fiend has one it is because he has burned out his stomach. But the stomach can be burned out in other ways. The drunkard must share his honors.

STRAW ITCH

If our relations with Mexico are broken off and our army is forced thereby to enter Mexico the soldiers will swap some of their present itches for others. They will get rid of their winter itches. Those are due to the hot, dry air common in houses, offices, stores, and some factories. Those will disappear within a week after the men are put into tents. Summer itch or bath itch will disappear. The supersensitiveness of the skin responsible for this condition will disappear.

In their place will come "chigger itch," old-fashioned, or seven-year itch, and straw itch. These are due to small bugs.

A few years ago the First Cavalry was camping at Elgin, Illinois. It bought straw from near-by farmers and filled ticks with it. At sick call each day a mob of scratching troopers came forward. They were broken out with an eruption that had the appearance of hives. In some of these wheals there were small blisters and some of these blisters contained pus.

Schamberg tells us that sometimes this straw itch looks like chicken pox and occasionally it has been mistaken for smallpox.

The government men found that this straw, or grain, itch was due to a small bug, a first cousin to the red bug, and a second cousin to the ordinary itch bug. This bug lives in the straw from grain fields. It lives on ordinary grain insects and only feeds on man when its usual food supply fails.

The bug is found in straw which has been stored without airing or sunning. Any commander who buys straw for his men can protect them from this parasite in a simple way. Let him see to it that the straw is exposed to the sun and air for one day before it is used to fill the ticks. The parasite is so delicate that one day of sunlight and air kills it.

The men who handle the infested straw should grease their bodies well with lard or vaselin. At night they should bathe thoroughly. The clothing should be sunned and aired for a day. Wildermuth showed that the parasite would starve to death in a day.

Fig. 238.—Red Bugs (harvest mites). Highly magnified. Dots under anal extremity indicate natural size. (After Riley.)

When the eruption is present the treatment is simple. The clothing should be changed and the infested clothes should be thoroughly aired. The bug does not bore in. The red bug buries itself in the skin; the tick buries its head; the itch bug bores deep but the straw parasite stays on the surface. A good bath and rub get rid of most of those that have not already turned loose.

To grease with a mild sulphur ointment helps somewhat. If there is much itching a soda water bath followed by a zinc oxid ointment will help.

Straw that has been exposed to summer heat or that has been cured outside does not contain parasites.

Probably an army in Mexico would not be troubled with this parasite. The troops in the state camps will suffer. This story concerns them.

It also concerns some people who do not go to war. Farmers working in grain fields suffer. Occasionally city people who sleep on straw mattresses suffer from it. In fact one of its names is straw mattress disease.

PSORIASIS

Probably few people are justified in going to much trouble about psoriasis. However, a person with psoriasis usually thinks he is willing to go to a good deal of trouble to control it. Some of them are. This may be accepted as an axiom. Anyone who wishes to spare himself trouble from psoriasis must go to some trouble.

Schamberg thinks that eating too much protein is a large factor in psoriasis. He argues that a man can cure his psoriasis or put it in such a condition that chrysarobin will cure it by changing his eating habits. In the discussion which followed the reading of the paper several excellent men disagreed with the proposal, but any suggestion from Schamberg is worth considering.

He advises the following diet:

BREAKFAST

	Ounces.		Ounces.
Bread	2/3	Apple	4½
Butter	½	Cream	1
Breakfast food	1/3	Tea	4
Orange	5		

LUNCH

	Ounces.		Ounces.
Bread	½	Turnips	2½
Butter	½	Cornstarch	6½
Grapes	5	Potato cake	10
Lima beans	1 2/3	Tea	4

SUPPER

	Ounces.		Ounces.
Bread	1	Corn	3 1/3
Butter	½	Celery	1
Prunes	3	Potatoes	7
Cauliflower	2½		

This furnishes for the day a total of 1,888 calories and seventy-five grains of nitrogen, enough for a man engaged in any form of desk work.

This he varies by substituting Diet No. 2, as follows:

BREAKFAST

	Ounces.		Ounces.
Bread	2/3	Bananas	3½
Butter	½	Rice	1/3
Grapefruit	5	Cream	1

LUNCHEON

	Ounces.		Ounces.
Bread	½	Cabbage	2½
Butter	½	Lima beans	2½
Cornstarch	5	Potato cake	8 1/3

SUPPER

	Ounces.		Ounces.
Bread	5/6	Corn meal	4
Butter	½	Prunes	3
Lettuce	5/6	Sweet potatoes	3 1/3
Beets	3 1/3	Cream	2/3

This diet furnishes 1,812 calories and sixty-nine grains of nitrogen.

It will be noticed that this is a vegetarian diet. The percentage of protein is brought up by such articles as bread, lima beans, potatoes and corn meal; the calories by cornstarch, potato cake, corn meal, sweet potatoes and butter. But of more importance than the regulation of articles of diet is the regulation of the quantities eaten.

BOILS

Since the time of Job a man's behavior when afflicted with boils has been the standard by which his patience has been determined. Boils hurt; they are diabolical in their selection of locations and they keep coming.

It is an ill wind that blows good to no one. The blood purifier people have reaped a rich harvest by selling blood medicine to people with boils.

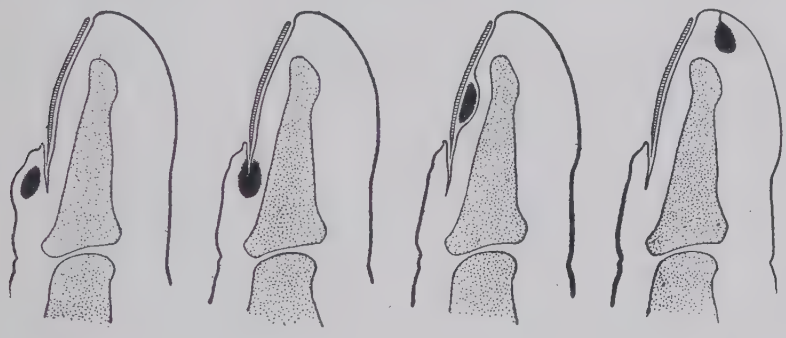


FIG. 239.—INFECTIONS AT ROOT OF, BENEATH AND NEAR END OF NAIL.

Their easy money is at an end. Almost everybody knows now that boils do not result from impure blood and that blood purifiers do not help one to get out of the Job class.

When a person near middle life has crops of boils it is advisable that he go to a physician and find out if he has diabetes. With that ruled out the cause of boils comes back to infection of the skin and the tissue below it by pus germs.

The age-old custom of poulticing a boil with a hot flaxseed poultice made the skin soft and soggy and a dull knife could cut it without difficulty. Incidentally it infected the near-by skin and caused a crop to grow where one boil had grown before. Therefore the plan now followed is to clean the skin and keep it clean—bacteriologically clean.

Berger advises to paint the boil and an inch around it on every side with tincture of iodin. Give it a good coat. Then apply ichthyol vaselin, 10 per cent, on a piece of gauze, cover with cotton and a bandage. The next day the dressing is to be removed, the skin cleaned with benzin, then the painting with iodin and the application of the ichthyol ointment are to be repeated.

This is kept up day after day unless the skin is irritated by the

iodin. If so, the iodin is left off and the ichthyol ointment alone is used. When the boil heads it may be lanced or left to open by itself at the discretion of the physician.

PRICKLY HEAT

Use talcum powder freely. If severe, wash with one part water and three parts alcohol. Dust afterward with talcum powder or wash with lime water containing two drops of carbolic acid to the ounce.

DERMOIDS OF THE FACE AND NECK

Not infrequently in the developing child some part of the machinery will not work just right. When two plates of bone are due to grow toward each other along an edge they may not get together at all and a cleft persists after birth, or one may get there first and turn the other to grow into the underlying tissue, or some other accident may happen. Many things are responsible for the location of these developments.

Miss Bevington wrote:

> The softest dimple in a baby's smile
> Springs from the whole of past eternity,
> Tasked all the sum of things to bring it there—

which caused Sir Francis Wilks to say "that there is a material basis for these pretty and significant lines." Bland Sutton says these small benign congenital tumors are prone to develop in the locations on the face where dimples occur.

Many of the congenital tumors, moles, birthmarks, hairy patches, tabs and clefts found on the face and neck are dermoids.

A dermoid is liable to result whenever in the development of the unborn child a bit of skin grows into some place where it does not belong. Among the better known dermoids are the following:

The tabs which frequently are seen on the neck of hogs, goats and sheep and occasionally on the throat of a man. In fact the old Greek statues of fauns always showed these tabs—dermoids—on the neck.

The small tumors on the ears or just in front of, below or back of the ears. In some cases these little mounds are covered by hair.

The small tumors, out of which a tuft of hairs grow, so frequently seen on the cheek about an inch from the corner of the mouth. Dermoid tubercles in this location are almost the rule in terriers.

The small tumors at the outer corner of the eye below the eyebrows and on the nose near the inner corner of the eye.

The small tumors on the bridge of the nose.

The tufts of hair which are sometimes seen on the bridge of the nose or at its tip.

DISEASES CONTAGIOUS THROUGH THE SKIN

Those whose conceptions of the contagiousness of leprosy are due to the Bible accounts are more disturbed by the proximity of a leper than is warranted. It is possible that leprosy was more violent two thousand years ago than now but it is probable that in those days many different diseases were called leprosy and some of them were very contagious. At least such is the

FIG. 240.—HOOKWORMS. a, newly laid egg; b, beginning segmentation; c, egg, further stage segmentation; d, e, advanced stage segmentation; f, preceding formation embryo; g, embryo in first stage; h, embryo just before leaving shell; i, embryo after leaving shell; j, embryo several days old; k, embryo covered by chitinous envelope in stage to infect.

conclusion of Dr. Ernest L. McEwen, who has studied the subject carefully and has written the results of his study in the Biblical World of September, 1911.

Leprosy today is a mildly contagious disease, the contagion spreading through the scarf skin.

Louisiana, Minnesota, California and the Hawaiian Islands find even moderately careful segregation enough to control the contagion of leprosy.

Nowhere does the problem of stamping out leprosy present great difficulty; certainly no difficulty comparable with diphtheria or measles.

Tuberculosis of the skin—lupus—can be spread by any case where there is secretion of pus but the danger of tuberculosis from this source is scarcely worth considering.

In some cases of typhoid fever there are typhoid patches on the skin—small, obscure, and easily overlooked. When cultures are made from fluid these red areas from typhoid bacilli grow—but typhoid is never spread in this way. The germs are always below the layer of dead cells of the skin.

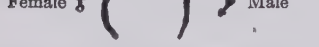


FIG. 241.—HOOKWORMS, ACTUAL SIZE.

In scarlet fever and measles there are skin eruptions in a rough way similar to those of typhoid. In these diseases the contagion is spread by the mouth and nose secretions but not by the skin.

Smallpox infection is distributed by the blood to many organs including the skin. It is probable, though it is not certain, that the germs of smallpox are thrown off with dead skin and skin exudates—that it is spread by the skin.

In itch and in ring worm the parasites causing the disease are just under the skin but do not wander any deeper. By applying proper insect destroyers to the skin they can be killed almost as easily as can those insects which are on the outside of the dead layer. Itch and ring worm are spread by the skin.

On the other hand, there is a group of parasites, of which hookworm is the only widespread illustration in this country, which get in through the skin but travel to find a field of activity elsewhere in the body. Whether a boy with "ground itch," "dew itch," or "dew poison" can spread hookworm through his skin I do not know.

People have quit poulticing boils, because poultices spread the pus germs of the boil from infected to noninfected areas.

Finally, there is a skin infection so widespread that it overshadows every other. It is that little known skin infection which causes somewhere about 70 per cent of the baldness. This infection is spread by brushes and combs.

HIVES

The scientists call hives urticaria. Until recently the man who knew the disease as hives had about as much information about it as the man who called it urticaria. He knew that raised red wheals or whelks which itched almost beyond power for restraint were hives.

Further he knew that a simple wash of witch hazel or soda water gave

some relief to the itching; that behind the trouble lay some irregularity in digestion and that a free purge was indicated.

In some cases attacks followed eating shellfish, strawberries or some other food toward which the individual had an idiosyncrasy.

The scientist is gaining on the man of general information. He has learned that the eruption is in the nature of a neuralgia; that behind the neuralgia lies the presence in the blood of a substance poisonous to that person. In most instances the poison has been absorbed from the intestines.

The poison most frequently present is an amin, formed out of an amino-acid named histidin. There are certain foods rich in histidin. Such are fish, blood, milk, juicy meat and especially meats from carcasses that have not been drained of blood and are classed with blood.

Acting upon this information, Salomon, Eustis and other physicians treat their hives patients by keeping them on a diet. For the first two weeks they live on tea, coffee, bouillon, lemon and grape juice, potatoes, rice, cereals, plenty of butter and sugar, and seven ounces of bread made from coarse flour. After the two weeks beets, celery and spinach are added to the diet.

In reëstablishing one's eating habit care should be taken to restrict greatly the quantity eaten of milk, buttermilk, cheese and all foods made from whole milk, eggs, fish and juicy meats. Boiled meat is less harmful, particularly if the meat is soaked in cold water before being boiled.

It is not possible to cure hives by this method unless the bowels are cleaned out and kept open. To bring about the first Dr. Eustis gives a calomel purge. To accomplish the second purpose he uses two or three ounces of albolene, agar in oatmeal in the morning or fig paste containing chopped up senna leaves. Drinking a full glass of water upon rising in the morning is a great help.

A method of giving relief to the itching and reducing the swelling used by Swan is of interest to the physician only. It consists of injecting under the skin a small dose of extract of adrenal gland. The hives disappear at once and stay away for eight hours. More than half the cases of hives are of the type which yields to this treatment.

The man who wants to escape hives can do so by eating the right food and refraining from eating the wrong food.

Eczema Loose Term.—*R. E. L. writes: "Do you mean to say that cleanliness will cure eczema? My uncle, himself a doctor, was slowly tortured into his grave with eczema, and my father's life is made miserable with the same trouble. It certainly is not a question of cleanliness with him, as he gives most of his time to caring for it. Father's is called, I believe, 'hidden eczema.'"*

REPLY.—I do not. Cleanliness is of very limited value in the cure of eczema. It will cure some cases.

Eczema is a very loosely used term. It covers a variety of skin diseases. Cleanliness helps some of them. Most cases of eczema will respond to a properly regulated diet, a hygienic life and proper toilet of the skin. I do not know what is meant by "hidden eczema."

Eczema in Babies.—*Mrs. L. G. F. advises for eczema of the head in babies that the following plan be tried:*

Besides the regulation of diet, I found, after costly experience, that eczema, if taken in time, will readily respond to simple remedies, such as vaselin, zinc ointment, and olive oil, if applied (according to the stage) in alternate treatments. In both my cases one thing used alone lost its efficiency in a short while, but the cure was effected by not using the same ointment in succession.

Cause of Dry Skin.—*W. J. writes: "What causes rough, dry skin on the arms and upper portion of the lower limbs, especially in winter?"*

REPLY.—Dry air in the living room and office.

Holds No Theory.—*B. B. B. writes: "I have understood that what eczema really is is unknown; that the American Medical Association's theory is that it is a parasite or germ attacking and imbedding itself in the skin at the most susceptible point; hence, it can be eradicated by external applications of germicides. Is this so?"*

REPLY.—If you mean that no definite single cause of eczema is known you are right.

The American Medical Association has no theory as to the cause of eczema. To take positions on such questions is not in its line. While any member may hold any theory he pleases not many of them think eczema is the result of a parasite or germ, nor do they use ordinary germicides in the ordinary way for the cure of eczema.

Eczema Not Contagious.—*B. L. C. writes: "We have an acquaintance who is suffering from eczema. It comes of blood poisoning caused by vaccination. Is there danger of giving this disease to members of a family where she has access to the bath and uses soap, towels, etc.? Being a dressmaker, is it safe to have her handle goods, do fitting, etc.?"*

REPLY.—Eczema is not caused from blood poisoning nor from vaccination. It is not contagious. It is not spread by soap or towels. It cannot be communicated in fitting clothes.

Has No Effect.—*Reader writes: "1. What effect does muriatic acid have upon a person having eczema, if taken one drop in half a glass of water twice each day? 2. Will it cause the eyes or lids of the eyes to swell?"*

REPLY.—1. None.
2. No.

Eczema.—*Subscriber writes: "I have a patch of eczema on my foot. 1. Please tell me what eczema is, and how it spreads. 2. Is it always hereditary, and, if not, may it be transmitted to the children of one having it? 3. What is the best method of curing it? 4. When cured will it stay cured?"*

REPLY.—1. Eczema is a mild inflammation of the skin. If you mean by "how it spreads," is it catching—No.

2. No as to each question.

3. Your physician will advise you how to change your habits and the care of your skin so as to put yourself in shape to have the patch get well. He will give you local applications which will help. Persist in doing as you are told.

4. It will if the new methods of caring for the skin and new habits are kept up. If not it may recur.

Scalp Eczema.—*A. F. writes: "I am bothered with eczema around the hair line. Sometimes it itches terribly, and I find dry sulphur is the only thing that stops it. What will cause this complaint to disappear?"*

REPLY.—Probably you have a seborrheic eczema. This is the most frequent cause of dandruff and loss of hair. The remedy is to take good care of your scalp, to wash your hair frequently, to grease it slightly, to use sulphur daily one way and another, to brush your hair well. To cure the condition by giving your hair attention all of the time, in season and out, is not difficult but you must stick to it.

Must Cleanse Daily.—*A. F. W. writes: "What causes itching, cracking of skin, and festering between one's toes? How can this condition be prevented?"*

REPLY.—This is an eczema. It results from decomposition of secretions and wastes. In other words, it starts from lack of cleanliness. Having started it may persist in spite of great care and cleanliness.

If the oozing is extremely bad cleanse daily with oil. If it is not so bad cleanse with soap and water. After everything has been made clean use powdered boracic acid as a dusting powder.

Daily attention is the keynote to success.

Sensitive Skin.—*B. S. B. writes: "I suffer from a severe itching on my chest and limbs after bathing. I have tried all temperatures of the bath water, but the itching is no less irritating in cold than in hot water, or even with the omission of soap. It usually lasts from twenty minutes to half an hour, and ceases only when I have taken a walk in the cool air. I have tried many patent remedies, but none of them has given me any relief."*

REPLY.—Do not bathe frequently and do not stay long in the water. Bathe in tepid water containing from two to five pounds of bran to the bath. After bathing anoint the skin with a little fresh oil or dust with talcum powder.

What Sycosis Is.—*C. M. D. writes: "Can you tell me what sycosis is and what causes it? Is it contagious? One of the neighbors is all broken out with it and I am wondering if it is best to go there."*

REPLY.—Sycosis is an inflammation of the skin, due either to pus cocci or ringworm infection or some allied cause. Ringworm is one form of sycosis. Barber's itch is another. It is mildly contagious. You are in no danger provided you do not use the same brushes, wash basins, and towels as are used by the affected person.

Warts.—*W. S. G. writes: "I want to know how to remove numerous warts from my hand."*

REPLY.—Trim them down to the quick, then burn with a hot pin or with nitric acid. Repeat after a week if necessary. Your physician would probably burn them with a carbonic acid crayon or carbonic acid snow—a better method.

Let Your Moles Alone.—*S. Q. P. writes: "Let me tell B. A. K. how I removed a mole which was growing near my left temple: It was nearly the size of a nickel when I applied oil of cinnamon occasionally for a few days, when I was able to remove it clean by picking. I then applied extract of*

witch hazel a few times and the skin healed. That was about two years ago and there has been no sign of a mole since."

REPLY.—I judge you mean a wart. Warts are easily removed. Sometimes it is entirely safe to remove them by any simple method; sometimes it is not. When it comes to moles the story is different. The penalty for tinkering with moles is death.

Mole on the Nose.—*Mrs. G. G. writes: "I have a mole on the end of my nose. It is conspicuous and getting larger. 1. Should I have it removed by an electric needle? 2. Is it dangerous or will it leave a noticeable scar?"*

REPLY.—1. I think you had better have it removed if it is growing.

2. Most moles are not dangerous, but from some of them sarcomas—a kind of cancer—develop. One should be suspicious of a growing mole.

Have Mole Cut Out.—*L. F. A. writes: "Would it be perfectly safe for me to have a hairy mole removed by the electric needle? It is located on my chin and seems to be growing larger."*

REPLY.—Perfectly safe? No; have it cut out.

Removal of Scar.—*W. W. writes: "Is a long scar caused by an operation in the neck removable by any means? It has caused great sensitiveness."*

REPLY.—Yes. A surgeon would cut out the scar and bring the edges carefully together. The new line of healing in a short while would fade to a delicate line. Massage begun soon after healing was complete would remove practically all trace of the incision.

You no doubt wonder, if this is true, why a scar was left after the first operation. The first operation was done to remove tubercular glands or abscess walls. The skin was affected more or less. The main object was to cure a deeper condition. Under those conditions scarring was unavoidable.

In the second operation there would be no infection; the field would be clean and the skin sound. The removal of the scar would be the prime and only object and therefore a cosmetic result would be possible which was not possible in the first operation.

Treatment for Eczema.—*E. R. H. writes: "What is eczema? When does it break out all over the body? Is it catching? Is it curable?"*

REPLY.—Eczema is generally a chronic oozing eruption. It affects patches of skin here and there. It is not catching. Most cases of eczema are curable. All cases are benefited by good care.

As to the remedy for eczema, what helps one case harms another. When a man discovers he has eczema the first step is to correct whatever in his habits bears on eczema and is in need of correction; the second, to correct contributing constitutional states; then to give proper care to his skin and especially his eczema areas.

In other words, treatment must be individual and it must also be broad. Salves and other eczema cures miscellaneously applied are usually disappointing.

Tetter.—*Tribune Reader writes: "What do you consider the best treatment for the disease known as tetter? Is it curable?"*

REPLY.—Tetter is another name for eczema. It is sometimes curable and sometimes not. Eczema is dependent upon a cause. If that cause can be found and cured the eczema gets well. The crusty eruption on babies' heads is frequently called tetter. It means the food is not quite what the baby needs. The proper treatment for this disease is to regulate the baby's food. When this is done the inflammation and oozing of the scalp stops.

Scalp Eczema.—*Paris writes: "What can I do to prevent my hair from falling out? My scalp is covered with a thick, oily dandruff. After washing the hair the dandruff soon appears again with an itching sensation. After drying my hair it is sticky and lusterless, so I can hardly get a comb through it. What causes such a condition?"*

REPLY.—I think you have a seborrheic eczema. It is reasonably certain that you neglected your scalp for years. Wash thoroughly with soap and water every day, rub in a very little vaselin and spend several minutes twice a day brushing your hair. Do not brush hard enough to make your scalp sore. Carry out this program persistently.

Has Flour Eczema.—*W. J. M. writes: "My work necessitates having my hands in flour a good deal, and on them has appeared a kind of scale with much irritation. A friend calls it 'flour eczema.' Does flour cause any such trouble? Doctors have prescribed different remedies, but they bring me no relief. I hear of others being troubled in the same way. What will help us?"*

REPLY.—Your trouble is flour eczema. Some bakers have this disease. It is more common among candy makers. If you will keep your hands out of the dough the condition will get well of itself. I think X-rays would be of service.

Would it be possible to wear rubber gloves while at work?

Cause of Fever Blisters.—*S. J. writes: "Will you please tell me the cause of so-called 'fever blisters,' and how can they be prevented? Why do they usually come around the mouth and always on the face?"*

REPLY.—Fever blisters may occur on any part of the body. They occur more frequently around the mouth than elsewhere. Fever blisters are found in pneumonia, in bad colds due to the pneumococcus, in typhoid, in malaria, and in several other diseases.

Digestive disturbances cause them. If a man has them without a definite disease or infection the probability is that the cause lies in the digestive apparatus. Too much food is being eaten or the food is not wisely chosen or the bowels are not acting properly.

In such cases they are to be prevented by changing diet, by better adjusting the food taken to the day's work and by correcting improper bowel habits.

Camphor for Cold Sores.—*E. W. S. writes: "1. What is the cause of ulcerated sores in the mouth? Have they any relation to cold sores? It has been found that camphor is a good cure for cold sores. Would it be harmful to rub camphor on the inside of the mouth?*

"2. What is the cause of large abdomen in a man 30 years of age? What exercise or remedy would you recommend to reduce the abdomen?

"3. What diet would you recommend for a man 30 years of age who is troubled with ulcerated sores of the mouth? He leads a sedentary life.

"4. Is the mortality from pneumonia high in Colorado or other places

of high altitude in the West? Is it true that pneumonia generally results fatally in places of high altitude? If so, why is this the case?

"5. Is it true that a person who is inclined to be gouty or rheumatic, and who has had rheumatism, is not so apt to contract tuberculosis as others? Is it true there is an antipathy of the two diseases, rheumatism and tuberculosis?"

REPLY.—1. The ulcers in the mouth result from digestive trouble; cold sore from an infection. Camphor on the ulcers will do them good. Touch the ulcers with a bit of cotton saturated in spirits of camphor; or a stronger caustic will be better.

2. There are several causes. Obesity is one. If the other muscles are flabby the abdominal walls will be flabby. When the abdominal walls are flabby the weight makes them pouch out. As the abdomen pouches the shoulders are thrown back to compensate. This bows the back and makes the abdomen pouch still more. Cut down the food and take exercises to strengthen the muscles of the abdomen.

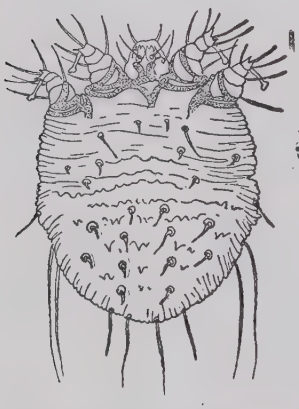


FIG. 242.—ITCH MITE. FEMALE.

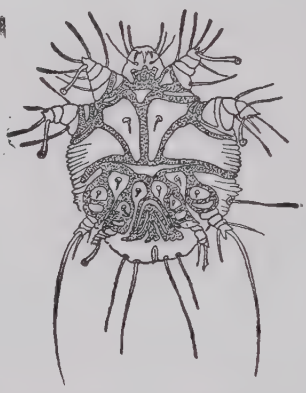


FIG. 243.—ITCH MITE. MALE.

3. You are right in thinking that the cure lies in the diet. How much you eat is of very much more consequence than what you eat. Eat vegetables, fruit, meat and bread, varying your diet from day to day, but eat not more than two-thirds what you are now eating. It is evident that all your troubles are cut from the same cloth—too much food and too little exercise.

4. [a] Yes; [b] The mortality rate is high, but the disease does not generally terminate fatally; [c] I do not know.

5. Yes. There are certain families which run to rheumatism, and other families that run to consumption.

Itch.—*W. writes: "Is a skin irritation of bright red spots that do not appear on the hands, but itch violently, a parasitic infection? Can the itch be communicated to a family by a washerwoman through the clothes? Are sulphur remedies the only treatment, or isn't there a treatment less offensive? Must the patient destroy all infected clothes, or is boiling a sufficient means of making the clothing aseptic and preventing reinfection?"*

REPLY.—1. It is difficult to say from so little data but red spots without break in the skin are not liable to be due to ordinary itch.

2. Yes. However, the danger from laundried clothes is not great.

3. If you mean applications to the skin there are other efficient preparations besides sulphur. However, sulphur preparations are not offensive.

4. The boiling temperature kills the itch parasite.

Ordinary itch is due to a parasite which burrows through the skin, especially in thin places such as between the fingers. The eruption is a mixture of blisters, pustules and scratch marks. The parasite is easily killed by chemicals and by heat. The disease is contracted by contact of sound skin with infected skin. Some infection by clothes as a carrier is possible. The disease is easily cured.

Cause of Itching.—*A. J. B. writes: "I read so many good articles in 'How to Keep Well' that I shall venture to ask a question that seems to puzzle several. 1. What causes itching of the skin? The skin is as smooth as a baby's and yet at times I have that acute itching which comes in spots, generally when I am sitting still or lying down. 2. Does tea keep one awake nights?"*

REPLY.—1. Dry air in the living room.

2. Yes.

Has Winter Itch.—*Mrs. J. D. C. writes: "The last four years I have had a rash break out on me every fall as soon as cold weather comes. It disappears in the spring. It first appears in spots and looks like tiny pimples and then turns scaly. Water seems to irritate it and cause it to spread. It is on nearly every portion of my body, but is worse at the joints. Will salves or blood medicine do any good? Kindly tell me what it is and what to do for it. I am 39 years old."*

REPLY.—This is winter itch. The most important factor in its causation is too little moisture in the air. Blood medicine will do no good; salves will do no good. Get a hygrometer. Keep the humidity of the air in your house above 50 degrees and you will get well. Drink an abundance of water.

Winter Itch Cure.—*A. T. C. writes: "I am troubled with an itching on the calf of the leg and occasionally on the forearm. The itching is much worse after taking a bath. At times it does not bother me, but after a bath it starts, and after a day or two a rash appears. My legs are usually cold, although I wear woolen underclothes. Is there any way that this disease can be permanently cured? It seems to be worse in winter than in summer, although I wear woolen all the year."*

REPLY.—Winter itch results from drying of the skin. Rub the skin with a little grease. Do not scratch. The air in your flat probably has a humidity of 10 or 15. Get a hygrometer. Evaporate enough moisture to keep the humidity over 50. When you do this your trouble will cease. Otherwise it will hold on until the heat is turned off in the spring.

Palliative for Itching.—*S. H. writes: "I noted with interest the article, 'Steam Heat Itch,' and feeling that I may be of service I offer, subject to your approval, the following remedy to S. H.: Three per cent carbolated vaselin, to be rubbed over the affected parts or surfaces with the hands. This is also a great remedy for prickly heat in summer. My experience seems to have been the same as S. H.'s, but, since using this remedy for the last few years, my two complaints have lost all their terrors. At times I had to 'cut out' fats and considerable of the meat in my diet. I had used many things, but this is the only one I found to relieve the trouble. In both cases the vaselin apparently oils the dry, parched skin and the carbolic acid takes away the sensations of itching, pricking, and irritation. Vaselin without the carbolic acid I found useless. At retiring time, when I disrobe, the sensations begin; I rub on the carbolated vaselin and put on*

pajamas. In a few minutes all disagreeable sensations have disappeared. The carbolated vaselin of commerce (of 2 per cent strength) I found not strong enough in my case, and I found the 3 per cent salve to be magical. For several years I have observed people with prickly heat make themselves worse with evaporating, cooling liquid applications and various kinds of powders. I use the salve as often as the skin gives trouble and desist when there is no itching or irritating."

REPLY.—Carbolated vaselin is a palliative. The cure is moister air.

Barbers' Itch Treatment.—*J. E. B. writes: "Kindly advise me as to the treatment for barbers' itch. It has got into the eyes and scalp now and is annoying."*

REPLY.—The hair should be cut short and the affected hairs pulled out. Wash the places twice a day and then rub in sulphur ointment. Rub it in well. Spend twenty minutes on the job. It is important that other members of the family do not catch this disease. It is contagious.

Dry Air Rash Cause.—*B. S. asks the cause of a rash breaking over the body and arms, but not on the face or neck. She asks if it is caused by heavy underwear, as she wears a light fleeced weight, or by the condition of the blood?*

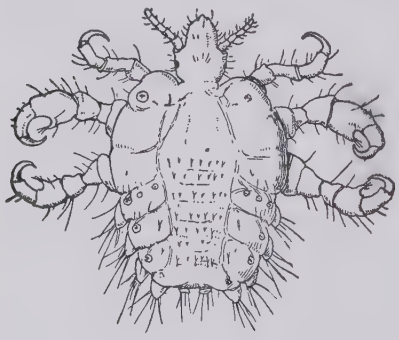


FIG. 244.—CRAB LOUSE (pediculus pubis).

REPLY.—Few rashes are caused by the blood. There is almost no relation between skin diseases and the blood. Your rash is due to living in a room where the air is too dry. Put an air vent in the radiator in your bedroom and let steam blow into the air. If you will keep the air so moist that the windows are always sweating your eruption will stop.

Cuban Itch.—*M. writes: "I hope that you will give the public some data as to the nature and particularly the characteristic symptoms of a highly contagious eruption called sometimes 'Cuban itch'; also some suggestions as to treatment and prevention."*

REPLY.—Cuban itch is smallpox. It came into the United States from Mexico about the time our troops were returning from Cuba. Someone jumped to an unwarranted conclusion and dubbed this brand of smallpox Cuban itch. The Cubans tell us they never heard of Cuban itch.

Cuban itch should be cared for in the smallpox hospital. It requires no treatment. The disease gets well spontaneously in about ten days. Treatment then consists in intelligently "standing by."

Bath Itch Relief.—*B. writes: "I wish to tell you of my experience with bath itch and the relief I have had from it lately. I spoke of my trouble with bath itch to a doctor, who said he had been troubled the same way, and told me how he got relief. After bathing, rub one portion of the body thoroughly with a perfectly dry towel before drying another portion. Use two bath towels, if necessary. This doctor said that a good deal of bath itch was really chapping from not thoroughly drying the body. I have*

tried this for a year, dusting with powder afterwards, and can now go to bed after my bath without the annoying itching sensation of old."

REPLY.—Readers will note that this is for bath itch, not winter itch or dry air itch.

Wrong Kind of Itch.—*M. J. L. writes: "I sympathize with A. T. C., who is troubled like so many others with winter itch. I have suffered from it for years, but I have found an absolute remedy at last. It is a tablet composed of reduced iron, 1 grain; arsenous acid, 1-50 grain; strychnin sulphate, 1-60 grain. I take one after each meal for three or four days, and begin one day before a hot bath is indulged in. The itch always follows a hot bath."*

REPLY.—You have had a bath itch and not winter itch. Yours was due to too little grease in your skin. It may be your iron-arsenic-strychnin has cured you, as you think. It may cure others; probably not.

Nails Have Diseases.—*E. A. writes: "May I ask you to give a few lines concerning the cause, but more especially, the cure for brittle finger nails? My nails are so brittle that I am obliged to keep them cut down to the quick, because if allowed to grow longer they soon split or crack and become annoying. My thumb nails are so troublesome that I am obliged to wear adhesive plasters on them for months at a time. If one of these plasters comes off in the night I have to get up and put on a new one, as the nail is otherwise sure to catch in something and tear the tiny rent farther down. The nails grow slowly."*

REPLY.—The nails have about as many different diseases as the other parts of the skin. If you can discover any disease of your skin around the root of the nails have that attended to. If you have diabetes, gout or Raynaud's disease have that looked after. If you work in a place where the air is extremely dry see that the air is humidified.

Keep your nails well greased. Once a day at least soak the ends of your fingers in water for a half hour or more; then dry them and grease your nails. Grease them well. Repeat the greasing process several times a day.

Can you not work out a way to protect your nails that will harm them less than adhesive plaster? Adhesive plaster is good enough for them in that it protects them; otherwise it harms them, it makes them more brittle.

Ingrowing Nail Treatment.—*J. R. H. writes: "I have been troubled with an ingrown nail for over a year. I have been to several chiropodists, but they do not seem to do me any good. I shall appreciate a little of your valuable advice, as I believe you can help me, as you have helped others."*

REPLY.—Shoes that press against the nail gradually push it to the side of the toe. As the front end is more easily displaced than the root end the nail comes to run somewhat diagonally from the root toward the side of the toe. In some of the toes the flesh overlaps the nail at the side. In these toes tight shoes cause ingrowing nails. In other toes they cause displacement of the nails but not ingrowing nails. In the light of these facts, what is to be done?

1. Adjust the shoes so that they do not push the toenails to one side.

2. Use cotton to lift the edge of the nail so that it rides above the bed along the side—the bed that the nail is irritating and that it sometimes causes to be infected. Lifting the edge of the nail so that it no longer irritates cannot be done in a day. The corner can be lifted and a very

small bit of cotton inserted today. Tomorrow the pledget may be a bit larger. In the course of a month it may be materially larger. The nail has consumed months in swinging to the wrong position; months will be required to get it into an unoffending position.

Keep Nails Oiled.—*J. T. M. writes: "My finger nails are ridgy and continually crack and become so sensitive that I can scarcely button my clothes. What is the cause of it, and what is the remedy?"*

REPLY.—The nails are subject to diseases. It is possible that you have one of these. If your nails get brittle in cold weather only, it is probably because they dry out. Even the outside air in zero weather contains little moisture. Room air is a Sahara, of course.

Do the best you can to find moist air to live in. Keep your nails well oiled.

Split Finger Nails.—*S. writes: "For several years I have had trouble with my finger nails splitting. They divide into layers, split down often half the length of nail, and break off until they get very uneven. The top of the nail is rough. Will any outward application help?"*

REPLY.—This condition develops especially in people who are under mental strain. It is much more likely to occur in winter than in summer. Care of the nails is of prime importance. Keeping the fingers warm is of importance. It is advisable to wear loose, woolen, fleece-lined gloves or mitts. A kid glove that binds or lets the hand get cold is harmful. To grease the nails helps.

Run-Around.—*B. C. W. writes: "What can I do for a felon or run-around? I have had one on my thumb for three weeks. It started with a white spot under the nail which has worked to the end of my thumb and has broken and pus has come out of it. I have put flaxseed poultices on it, and iodin, but they do not seem to do any good."*

REPLY.—Stop the poultices or you will never stop the run-around. Clean it with soap and water and then with peroxid. To paint the nail and skin with tincture of iodin occasionally may be of some service. Keep pockets of pus drained out. Put a light, loose, clean, aseptic gauze bandage around it. Let plenty of air get to it. A run-around treated in this manner will get well of itself in a few days in nearly every case. When the infection gets around the root and bed of the nail it may be necessary to slit or even remove the nail. In that event you had better not try to go farther on your own hook.

Removing Tattoo Marks.—*O. E. B. writes: "Can tattooing be removed from a person's arm and is it painful or serious to have it done?"*

REPLY.—To a limited extent it can be done. Rarely is one justified in having it done.

Spots on the Face.—*W. F. writes: "During the cold spell this winter I came in one evening and white spots were visible on my face. I rubbed them with snow and my face did not get sore, but since then my face gets black and blue when the least bit cold or on a windy day and at all times a white spot is visible and my face looks so red. Is there anything I can do to cure this?"*

REPLY.—Did you read the article on Raynaud's disease? Read the article on the subject in Osler's "Practice of Medicine" in the public library. You probably will have no trouble during the summer.

Bad Complexion Cause.—*E. R. writes: "What is the cause of catarrhal jaundice? Does eating much sugar or sweets have anything to do with a yellow complexion?"*

REPLY.—1. Infection and inflammation of the gall bladder and bile ducts. The inflammation shuts off the narrow bile tube leading from the liver to the intestines and the bile, instead of flowing out, is absorbed by the blood.

2. Eating too much of anything and exercising too little in the open air are important causes of a bad complexion. Particularly does open air exercise in bad weather help the complexion. Sugars and sweets in moderation are no worse than other foods.

Will Discolor the Skin.—*Constant Reader writes: "Will ammonia and peroxid discolor the skin if used for a certain length of time to destroy superfluous hair?"*

REPLY.—Yes, to some extent.

Bleaching the Skin.—*Actress writes: "Would it be safe to use peroxid of hydrogen for bleaching my arms? If you think it is too strong, please tell me how to dilute it. Do you think this will whiten my arms?"*

REPLY.—It will be safe in the sense that you will survive. You might use it for a year or so without harming your skin. In time it will spoil your skin. It will bleach what it can easily reach. Why not powder your arms? It will do less harm.

Liver Spot.—*K. X. Y. writes: "When I was 6 years old I was sick with some kind of bowel trouble for three or four months. After I got well there appeared a brownish spot on the right side of my nose. It is now about the size of a dollar. Can you tell me the cause and how I can remove this disfiguring mark?"*

REPLY.—This is probably one of those chloasma spots usually called liver spots. They do no harm. If the appearance is objectionable perhaps a skin specialist can bleach it fairly well. Unless it disfigures your face you had better let well enough alone.

White Spots on Body.—*E. M. writes: "For years I have noticed small and large white spots appearing on my hands and neck, some small ones on my body. At times they are more pronounced than other days. Lack of pigmentation, I am told. Is there no cure for them, and is there any danger to life?"*

REPLY.—No doubt you notice these spots more than anyone else does. There is nothing to be done. They will never endanger your life.

Brown Patches on Face.—*L. E. writes: "What is the cause of brown patches upon the neck? Can they be removed by external application? Is it liver or kidney torpidity or what?"*

REPLY.—Brown patches on face and neck are due to constipation or congestion of the liver. External applications are of no value. The heart

should be examined. Proper treatment under the care of the family physician should be taken for the underlying conditions.

Sweating Arm Pits.—*Subscriber writes: "How can I prevent excessive sweating in the armpits? I am a man of 19. Every day I sweat under my arms down to my waist, during the cold weather more than when it is hot. It goes through my clothing, destroying the suit."*

Reply.—The sweat glands are influenced by the mind to an exceptional degree. To watch for and dread this phenomenon makes it worse. To wear rubber sweat shields also makes things worse. Try dusting the armpits with powdered tannin.

Chapped Hands.—*F. O. V. G. writes: "My fingers chap, or crack open. I work at an editorial desk in a steam heated but well ventilated room. I live in a hot water heated house, also well ventilated. I have tried many lotions, camphor creams, vaselin, and other remedies, with only temporary relief. What would you suggest?"*

Reply.—As you refer to the heating I assume that your trouble manifests itself only in the winter. To keep the humidity of your rooms over 50 will help but probably will not wholly remedy the condition. Various obscure conditions relating to the nourishment of the skin of the hands, such as Raynaud's disease and allied conditions, get worse in winter. The temperature and humidity conditions are to them important contributing causes. My guess is that the main cause lies in some ductless gland perversion. Why not let your physician try thymus, thyroid or adrenal on you?

Cure for Cracked Hands.—*E. J. J. writes: "My brother froze the back of his hand three years ago. During the summer it seems to be healed, but every winter the sores become renewed and keep cracked open all winter. He has used patent salves and prescribed medicines, but they do not help him."*

Reply.—The circulation in the skin of the back of his hands is poor. The skin nutrition is bad. When the cold makes the skin anemic and the cold air dries it further, it cracks. Patent salves will do no good. To keep the hands warmly covered all the time is the only remedy. Out of door work is better than indoor work when the hands can be kept warmly covered; otherwise indoor work is better. If indoor work is done the air must be kept moist.

Psoriasis.—*Inquirer writes: "What is psoriasis—the cause and symptoms?"*

Reply.—Psoriasis is a chronic, patchy, scaly eruption of the skin. The patches are reddish or brownish and covered by dry, silvery scales. There is slight itching. There are no symptoms except as noted above. People with psoriasis are healthy and happy, or ought to be. Nobody knows the cause.

Treatment of Psoriasis.—*M. K. writes: "Do you know of any remedy for psoriasis? I am not constipated, eat moderately, seem to be in good health, but every two or three years I have a general outbreaking of psoriasis."*

Reply.—There is no remedy for psoriasis. At the same time, psoriasis, taken care of, causes little disturbance and sometimes disappears for years.

It is well to wash the patches thoroughly and grease them with a mildly stimulating ointment—oxid of zinc ointment or one somewhat more stimulating—tar or creosote ointment. Sometimes a simple diet such as a gouty person would follow is advisable. Most cases of psoriasis do not call for any attention.

Not a Bar to Marriage.—*Reader writes: "Is psoriasis a bar to marriage? Have been troubled with it for about sixteen years and have been told there is no absolute cure. I have been taking Fowler's solution of arsenic in doses ranging from five to ten drops. Is there danger in taking arsenic?"*

Reply.—Psoriasis is not a bar to marriage. Do not take Fowler's solution as a matter of routine. Occasionally it helps psoriasis but that does not mean that one should take it in a routine way.

Psoriasis Not Hereditary.—*C. S. writes: "In a recent issue you say that psoriasis is incurable. Is there no internal remedy that will affect the condition of the skin sufficiently to make at least a temporary cure? Will climate affect the disease? Is it hereditary?"*

Reply.—Temporary abatement of psoriasis, in a certain sense a cure, is frequently brought about by care of the habits and of the skin and by the careful use of local applications and internal medication. Climate sometimes helps in a general way. It is not hereditary.

Peroxid and Psoriasis.—*J. J. D. writes: "I have been afflicted with psoriasis for a number of years. By accident, I spilled a quantity of hydrogen peroxid on the affected area. The peroxid ate up the scales, and, while it has by no means effected a cure, it has reduced the frequency of appearance of the scales, and destroyed irritation."*

Reply.—While curing psoriasis is difficult, keeping the patches in condition is not exceedingly so. The use of peroxid occasionally is one way. Occasional use of wet packs is another.

Pityriasis.—*Chicago writes: "Is there any possible cure for phthiriasis of a number of years standing?"*

Reply.—I suppose you mean pityriasis—a scaly, scurfy eruption sometimes attended by itching. It is of no particular consequence. Nobody is liable to die from it nor is it found in people in poor health. Use sulphur ointment regularly.

Have It Removed.—*C. A. A. writes: "I have had a wen on my head for a long time. Do you think it is harmful? If so, how could I get rid of it?"*

Reply.—A wen on the head is about the most harmless of tumors. Have it removed with the knife.

What Ringworm Is.—*I. R. writes: "What is ringworm? Can it be cured? If so, please outline the best and surest treatment for it? Is a doctor able to cure it through some specific remedy?"*

Reply.—1. Inflammation of the skin due to a parasite.

2. Yes, the best and surest method of cure is the use of X-rays. A good method is to pull out the hairs in and around the ringworm patch and to keep them pulled out. Wash the patch twice daily with soap and

water and then paint with iodin or rub in a sulphur and mercury ointment. Spend at least ten minutes rubbing the ointment in.

3. Ringworm cannot be cured by anybody in a short time. Patient, persevering thoroughness is a necessity of treatment. It matters little what drug is used. It matters much that patient, thorough care be given.

May Be Ringworms.—*Mrs. C. N. writes: "Will you tell me what three or four bright red patches on a man's scalp might be? They are covered with a crust and are of a month's duration. He says they do not itch, but he is constantly scratching them when home.*

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FIG. 245—RINGWORM OF THE SCALP.

"The scales are showing in his hair. He 'poohs' at the idea of their being anything, but his mother has had eczema all her life and other members of his family have had the disease, and now his 10-year-old daughter shows a spot similar on her scalp and he laughs at the coincidence. This man won't be careful about using others' combs or put his wash rag out of the children's reach. Should he?

"He also has a hard lump on the back of his neck. When it gets uncomfortable he squeezes bad smelling matter out of it. It does not pain him."

REPLY.—These patches may be ringworms, psoriasis or eczema. Some of the scale patches are contagious, others are not. Individual brushes and combs, rags and towels should be the rule where there is no scalp or skin disease; doubly so when there is a skin disease. You should make this family see a skin specialist if you have to tie them down to accomplish it. The lump is probably a sebaceous cyst. It should be treated at the same time.

Cures for Ringworm and Warts.—*G. B. writes: "I know from experience that iodin will kill ringworm and chromic acid will kill warts without pain."*

Cure for Ringworm.—*F. R. of Cleveland writes: "For the last ten years I have been troubled with ringworm on my lower legs. One physician prescribed tincture of iodin and another a white mercury ointment. They seem to do the work temporarily. What do you think is the cause? I bathe daily—that is, a shower bath—and eat regularly. My bowels are regular, with now and then a little constipation. My meals are light. Am a traveling man and my business requires me to do a great deal of walking, which I consider plenty of exercise. I weigh 175 pounds, height 5 feet 6 inches. My general health is good. I was examined for life insurance seven years ago and passed as extra fine risk. Is ringworm contagious?"*

REPLY.—If you have ringworm it is contagious. You could suffer a 50 per cent reduction in the present excellent state of your health and still be above the line when the general health has any effect on ringworm. Ringworm can always be cured by: (a) persistent cleanliness; (b) persistent use of iodin, mercury ointment; or in bad cases (c) use of a vaccine on or in the skin. However, I doubt if a cleanly fellow like you would have ringworm for seven years even though you are a drummer and not long enough in one place. Haven't you psoriasis or some other sticker? If so, it is not contagious and one's physical condition is of importance.

Scars and Their Removal.—*Reader writes: "Can scars be removed? About a month ago you said in an article that they could not be removed, but I read some time ago that whenever a criminal had scars he could go to a specialist and have them removed. Can real small scars, such as little holes made by pimples and blackheads, be removed?"*

REPLY.—1. Scars can be removed. I presume you refer to some reply in which I told someone his scars could not be removed. If it would be necessary to skin a man to get rid of his scars that man should content himself with his scars.

2. Massage will minimize acne scars. Beyond this it is not good judgment to go.

Warts and Moles.—*R. C. C. writes: "Kindly tell me what will remove warts and moles. Also could you tell me how to make 'sage tea and sulphur' tonic for the hair?"*

REPLY.—1. Ordinary warts can be removed by any one of the following plans so they will not return: Run a redhot needle through the wart. Clip the wart with scissors and burn the bleeding point with a little nitric acid on a match. Apply salicylic acid as in corn salve.

2. Do not do anything with a mole. If a mole is touched at all it should be completely removed by a surgeon.

3. The sage tea and sulphur combinations as advertised are merely blinds for the sale of a patent medicine. Sage tea and sulphur is not good as a hair tonic. Use soap and water, rubbing and brushing.

Wrinkles Can Be Reduced.—*J. F. wants to know: "1. If it makes any difference which direction the head is when sleeping at night?*

"2. She is nearsighted. Her face is beginning to wrinkle around the eyes. What causes it? Is there a cure?

"3. Does massage with cream prevent wrinkles?"

REPLY.—1. No, if you mean with regard to the points of the compass.

2. Your eyes are being strained. The remedy is glasses which relieve the strain.

3. In some measure, yes. Wrinkles come because (a) the underlying muscles fold the skin so continuously that it becomes adjusted to the new position; or (b) the fat and water absorb from the space just below the skin so that the skin no longer fits; or (c) the natural elasticity of the skin is lost.

Cure can be brought about: 1. By getting fat—the loose space fills up. 2. By preventing the muscle contraction which wrinkles the skin. 3. By rubbing it into a smooth position, remembering always that a few minutes each day rubbing out wrinkles cannot offset twenty-four hours of wrinkling by muscular action.

Wrinkles Defy Lotion.—*J. G. writes: "Will a wash lotion made by dissolving one ounce of powdered saxolite in one-half a pint of witch hazel eradicate lines and wrinkles in the face? If not, what will? Would this lotion be harmful to the skin?"*

REPLY.—It will not eradicate lines and wrinkles. Getting fat will. Massage will be of some service. No lotion will be of any service.

Shingles.—*S. A. L. writes: "1. What causes shingles? 2. Is it contagious? 3. Will alcohol and cold baths cure it?"*

REPLY.—1. It is a form of neuralgia.

2. No.

3. Yes, anything cures it; that is to say, it gets well automatically. A purge and light diet with proper attention to the cleanliness and care of the blisters is the best treatment.

Shingles Not Dangerous.—*Mrs. S. writes: "Kindly give me some information regarding the shingles—what causes them and how they affect a person? Are they dangerous for an old person, and what are the effects they leave? How long does it take to get over them?"*

REPLY.—Shingles is a form of neuralgia. The condition is not dangerous and leaves no after effects. Purgatives, local applications and neuralgia medicines effect a cure.

Cause of It Not Known.—*Sufferer writes: "Will you kindly give me the following information:*

"1. What is the cause or origin of ichthyosis?

"2. What relieves or cures it?

"3. What work on the subject, easily obtainable and intelligible to a layman, should I read?

"4. Is it a common ailment?"

REPLY.—1. Ichthyosis is a congenital disease the cause of which is not known.

2. Nothing cures it.

3. You can understand all the essential points in any textbook on skin diseases.

4. No.

Boils.—*A. J. O. writes: "What causes boils? My husband, who is 57 and has never had a boil before, has just had five inside a month. He does office work and is always studying and reading, so he gets little physical exercise except walking. We eat no meat during the three summer months and only three or four times a week the rest of the year. We have fruit three times a day the year round. I have 160 quarts canned now for this coming winter. There are only three in our family, and husband eats fully half the fruit. Can fruit eating be overdone? We use no coffee. Husband drinks tea for breakfast and lunch."*

REPLY.—There are germs capable of causing boils on the skin all the time. Occasionally some of these travel down a hair shaft or into a grease gland and set up an infection called a boil. When such an accident occurs, usually something in the internal economy is wrong. Where a man—a heavy eater of canned fruits—gets a succession of boils the first thing to be thought of is diabetes. If an examination shows diabetes not present

the next suggestion is low opsonin index as regards the pus cocci. This last calls for a vaccine. I assume that the toilet of the skin is properly done, for both before the boils and during their existence wet, soggy poultices foul the near-by skin and thus help to cause secondary crops of boils. Fruit eating, particularly sweetened, preserved fruits, can be overdone—leading to indigestion, glycosuria—a form of diabetes—and boils.

Don't Poultice a Boil.—*H. K. writes: "Kindly inform me if there is anything besides hot flaxseed poultices that is as effectual in relieving and maturing boils."*

REPLY.—A boil will get well whatever is done for it. A flaxseed poultice is a bad thing to use on a boil as it often causes secondary boils to come. The hot, wet, dirty mess occasionally infects the near-by skin. Crops of boils and fresh boils around the old boil were frequent when poultices were in vogue. If you want to apply heat use a hot boracic acid solution pack made with gauze and covered with rubber tissue or well bandaged, or use a hot water bottle.

Carbuncles.—*J. F. writes: "I have been troubled with carbuncles on the back of my neck. What is the cause of them? Can I take something that will keep them from returning? What should I eat? I use no tea, coffee, or any alcoholic drinks. I am 70 years of age. Are carbuncles dangerous?"*

REPLY.—Carbuncles may be dangerous, especially in a man seventy years of age. First find out if you are a diabetic. If so regulate your diet accordingly. If you are not diabetic eat about what you have been accustomed to eating. Look well to the cleanliness of your skin. That means be firm in refusing to use poultices. Some of your friends will want to poultice your neck. Fight them off. A poulticed neck is a dirty neck and a dirty neck will mean more carbuncles. Carbuncles are due to an infection of the deeper tissues beneath the skin with pus germs that have traveled down from the surface of the skin. Keep in the open air and keep your secretions right.

Cause of Pimples.—*C. L. W. writes: "What causes red pimples, which are hard under the skin, to break out continually on my face?"*

REPLY.—It is due to fat and débris that accumulate in and around the sebaceous follicles of the skin. This fat and débris, being foreign bodies, irritate the skin and when not removed cause inflammatory lesions—"red pimples"—such as you complain of.

Having resorted to minor measures for relief you would do well to have a careful doctor examine you and advise as to plan of treatment. He may give you the vaccine treatment. He may have you wash your face night and morning with lukewarm water and soap, rinse well, dry thoroughly and then apply freely and rub briskly with equal parts of alcohol and a saturated solution of boracic acid. He will also direct you as to diet, exercises, baths and habits of sleeping.

Blackheads.—*Anxious Mother writes: "Please give me advice as to what to do for my daughter. She is 15 years old. For the last six months she has been greatly troubled with pimples and ugly blackheads on her forehead."*

REPLY.—The skin is filled with grease glands. They are necessary. When they clog up, the secretion is called a blackhead. You should see that she does not overeat, that she is not constipated, above all that she exercises in the open air. Keep her face clean and keep the blackheads squeezed out. You could not stop the secretion of these glands if you tried and you should not try.

Cause of Whiteheads.—*R. L. writes: "I am troubled with whiteheads. I press them out. How can I get rid of them?"*

REPLY.—There is no way except the one you are using. The pores of the grease glands are liable to be grown over by skin, especially when spectacles press or where the skin forms fine wrinkles. When the duct is overgrown the secreting gland causes the small accumulation of white grease called a white head.

Acne.—*C. C. A. writes: "The face of a friend is in a very pimply condition and has been for a number of years. It is not itchy, merely covered with red spots. Some time ago I had another friend troubled in a similar manner. He went to the sea and bathed in it every day, and when he returned home his skin appeared in a perfectly healthy condition. If not sea or salt water, what do you recommend in the former case? He has been taking blood medicines."*

REPLY.—I judge your friend has pimples or acne. Blood medicine will not be of any service. His skin is probably greasy and if so salt water or sea water will help. In the main, however, reliance must be put on such measures as limiting the diet, correcting constipation, keeping the skin clean, expressing blackheads, and vaccine in cases when it is needed.

Pimples and Blackheads.—*F. A. S. writes: "I am troubled with pimples and blackheads. Please suggest a remedy for them."*

REPLY.—In some cases, squeeze them out, then wash vigorously with soap and hot water and dry with rough towel. This materially aids in keeping the grease glands open, the closing of which has much to do with the cause of the blackheads. Apply alcohol morning and night at the same time rubbing the face vigorously with the hands. See that the bowels move freely and regularly each day. Eat sparingly of meats, especially greasy meats, but eat freely of fruit, especially apples, prunes, figs, dates, cranberries, and the like. If this does not cure you, have your family physician direct you to some reputable skin specialist.

To Prevent Pimples.—*"1. Will you be kind enough to tell the causes for pimples on a young man's face, and how to prevent them? 2. Does electric massage help any?"*

REPLY.—1. (a) Wash the face with soap and water and then with alcohol often enough to keep it clean. (b) Squeeze the blackheads out. (c) Eat less and exercise more. (d) Cure your indigestion and constipation.
2. No.

Acne Vaccine.—*W. G. writes: "What is acne vaccine and where can it be procured? Can it be used without consulting a physician?"*

REPLY.—Acne vaccine can be had from the large manufacturing pharmaceutical houses direct or through local druggists. It can be made from germs grown from the patient's pustules. Most of the laboratories

make vaccines after this plan. It cannot be used except by a physician. No good would be accomplished.

Alcohol for Blackheads.—*G. of Kenosha, Wis., writes: "1. In spite of my daily baths and fairly good digestive system, my face is filled with blackheads and it breaks out with pimples, especially on my chin. Will you please tell me what will remedy this?*

"2. In school I notice after about an hour's work my hands become cold and clammy. What is the cause of this?"

REPLY.—1. Eat less, keep the blackheads squeezed out, keep your face cleaner, use alcohol if necessary.

2. Exercise more in the open air. Control nervousness.

Pimples Not Blood Disease.—*G. H. R. writes: "The writer has been troubled with acne [so the local doctor calls it] for some five or six years. At times the face will clear off altogether and then pimples will break out afresh. I have been advised to leave off eating greasy foods and pastries, but it seems that does not help, for the skin will break out just the same. I have also tried dieting. Does dieting help or hinder the ailment, or should it be treated locally? Is it caused by bad blood or is it merely a skin disease? Do different foods affect or help the disease in any way, or will it gradually go away of its own accord?"*

W. C. H. wants to know if smoking causes pimples on the face. If not, what does, and what can be done to get rid of them?

REPLY.—Smoking does not cause pimples. When it comes to answering your other questions the difficulty is greater. Certain glands of the skin secrete grease. This grease normally oozes out on the skin and keeps it pliable. Sometimes these glands stop up. The top of the gland may grow together, the gland may be plugged by dirt or some grease may become hard and plug it. Such glands distended with grease are usually called blackheads.

Skin bacteria frequently get into these distended glands and cause little boils, called pimples. So, back of the pimples lie the blackheads; back of the blackheads lie the state of general nutrition and the state of the skin.

Before we go further there is one thing that should stand out clear. Pimples is not a blood disease. They are not due to a condition of the blood. They have nothing to do with the blood—certainly not in the sense in which the statement is commonly made. Broadly speaking, skin diseases have less to do with the blood than any other diseases.

Pimples usually develop in the middle of the teens—the boy or girl eating too much and exercising too little. Some of the food which should be burnt up into energy is going into fat. Some of this fat is stored under the skin. Some of it is stored in the liver. Some of it goes through these grease glands.

So the first step in the cure is to exercise more and eat less. The second step is to scour the face with soap and water and occasionally with boracic acid and alcohol. After the case gets to the pimple stage, the person affected had better quit following general advice and get individual counsel and follow it persistently.

Serum Treatment for Acne.—*"A Reader" writes: "I am 22 years old and have had acne for six or seven years. It seldom shows upon my face, but my shoulders are always covered with large pustules. I have taken quite a lot of blood medicine, but it seems to do no good. I tried the serum*

treatment last summer, taking two treatments of staphylo-acne bacterin. During this treatment the pustules disappeared rapidly, but after a month or two they returned and are now worse than ever. Is there any cure for acne?"

REPLY.—The vaccine did you more good than anything else. Use it again. Keep it up longer than you did before. Keep blackheads pressed out systematically.

Cause of Hives.—*L. W. D. writes: "What is the cause of hives and general itching of the skin? What is the remedy?"*

REPLY.—Hives is the result of eating some article of food which is poisonous to that particular person. To another person the food may be wholesome. To cure hives someone recommends painting the patches with collodion. A purgative should be taken. To prevent hives avoid the foods which disagree.

I do not know just what you mean by general itching of the skin. Hives is not a general itching.

Cause and Treatment of Hives.—*E. P. A. asks cause of hives and how to get rid of them. He asks if there is any kind of diet for them and how long they last.*

REPLY.—Hives is an eruption of the skin in the nature of a neuralgia. Just as behind the eruption there is neuralgia so behind the neuralgia there is a cause. There are many different causes of hives. Sometimes one is responsible, sometimes another. There is no cause of hives that is common to every case. The thing to do is to find what has been the cause in each individual case. Probably food poisoning is the most frequent cause. Sometimes the food which has caused it is of good quality, at other times it is spoiled. The most frequent cause is a hypersensitiveness to certain foods.

How to Avoid the Hives.—*W. A. writes: "Would you kindly state the cause of hives? About every month or two I break out with them. I have thought that it was something that I eat, but what it could be I do not know."*

REPLY.—Hives generally are caused by some disturbance of the alimentary canal. Certain articles of food, such as shellfish and strawberries, often produce hives. The treatment generally consists of a good purge and bathing the affected parts with baking soda and water. Find out what foods cause hives and avoid them.

Freed of Hives.—*R. L. writes: "For years I suffered from hives in summer, and I accepted it as a summer trouble of some kind. My brother also suffered from it every summer. Several years ago I was advised to eliminate meat that summer and eat all the fruit I wished. This I did, and from that day to this I have never been troubled with the hives. I never eat meat more than twice or three times a week at any time of the year, but in the warm weather I do not eat it more than once a week. My brother also follows the same course in summer, and he is no longer troubled with the hives. To eliminate meat from one's diet means gravy, meat soups, and meat fats. Eat nothing fried in meat fats or made with lard or suet. Substitute butter, cream, milk, cheese, and eggs. Vegetable soups*

and cream soups made without meat are good. I have had only one cold in four years, which improvement I also attribute to the change in diet."

REPLY.—Some will benefit from following your plan; others will not.

Treatment for Hives.—*W. F. N. writes: "My wife is troubled with hives. New irritations have been coming daily for a week. We have applied camphor spirits and they have given her local but only temporary relief. She is not an abnormal eater of pork, and it is not the strawberry season. Her appetite is so normal and healthy that it is difficult to discover any cause in her diet. What other things may cause the disturbance, and what remedy should we apply?"*

REPLY.—Hives usually results from eating something that disagrees. The food that causes hives in one person may be the most wholesome of foods for the average person. Buckwheat, fish, salmon, oysters, strawberries and pork are among the more frequent offenders.

Have your wife take a large dose of castor oil. Have her go on a bread and milk diet and gradually increase her diet list.

How to Prevent Hives.—*A. R. writes: "Will you kindly tell me the cause of hives? Is there any cure?"*

REPLY.—Hives is a nervous eruption due to some kind of food poisoning. A good dose of a purgative cures it. The purgative may have to be repeated. Foods which cause it must be avoided. They may be entirely wholesome for other people; the peculiarity is in the person rather than in the food.

CHAPTER XLI

The Teeth and Hair

THE TEETH

THE TEETH AND HEALTH

The thumb sucker has a face that tends to narrow just below the nose. The arch of the palate is high and the front teeth, especially in the upper jaw, point forward. Over them the upper lip must curve and in consequence it appears shortened.

The mouth breather has a long and somewhat lantern-jawed face. The lower jaw tends to narrow and the mouth hangs open. Once you have seen one or more mouth breathers you will have little difficulty in picking them out.

However, if you are intent upon thus employing your idle thought you must be up and doing. The purpose of nature is to fit the face to a certain inheritance. Thumb sucking and mouth breathing interfere with the plan. But nature stays on the job and in time the deformity may be remedied. Many beautiful women and handsome men had thumb sucking and mouth breathing stamped on their faces in childhood as plainly as one of these new style advertising signs.

When nature fails all is not lost. The dentist remains. The parent whose child was neglected until a bad "bite" was acquired can make amends in part by having the dentist push and draw the teeth until the "bite" is right. Ordinarily this is not done until the permanent teeth are out—say, when the child is ten to fifteen years old.

In one sense that is a good period to do the work—just before and at puberty. Certain biological changes are taking place. In consequence the bones are changing form and shape in many particulars. It is therefore a propitious time to mold jaws and rearrange teeth.

A better beginning time, though, is when the baby teeth are still in place. As the jaw is molded in the days of baby teeth it is apt to grow.

A proper "bite" is necessary for health. A good digestion is dependent on good chewing. When the "bite" is poor it is difficult to keep the teeth clean, and, finally, teeth that grind against other teeth are much more liable to keep sound and to set still and firmly in their sockets than useless ones. Nature does not long tolerate teeth or anything else that does not do work. A proper "bite," then, has health relations as well as dental relations.

The teeth are not dead structures. They are always undergoing change. The horse trader judges of the age of a horse by the shape of the grinding surface of its teeth and the shape and size of a certain dark area on that grinding surface.

A horse is constantly grinding off the surface of its teeth. It grinds

through the enamel into the dentine, whereupon the dentine gets enamel-like in its hardness and denseness. It grinds down to the pulp chamber, whereupon the pulp chamber fills up with dentine and gets as hard and dense as enamel.

The small, dark area by which the dealer judges age is the former pulp chamber. In the pulp chamber are contained the arteries, veins, nerves and lymph vessels of the tooth. Bacteria have been known to travel from the pulp down into the neighboring tissue.

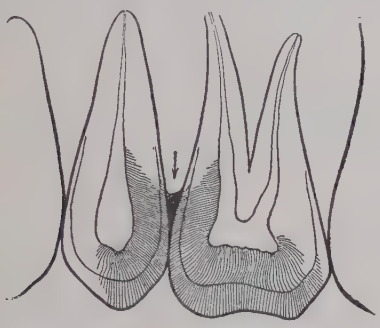


FIG. 246.—UNCARED FOR TEETH SHOWING FOOD PARTICLES, WHICH, FERMENTING, FORM ACID. (*Dental Summary.*)

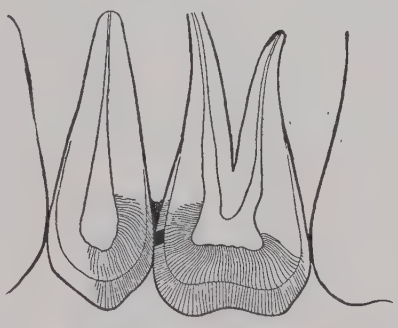


FIG. 247.—UNCARED FOR TEETH. ACID ATTACKING THE LIME IN THE ENAMEL RODS. (*Dental Summary.*)

A number of years ago the elk in Lincoln Park, Chicago, got lumpy jaw. The infection was manifest in the glands of the neck just below the jaw. But Cy De Vry found that the teeth contained great cavities and that the cavities were filled with infected food. The lumpy jaw infection had traveled as ordinary infections travel.

The preferred route is down the side of the tooth to the lymph spaces in

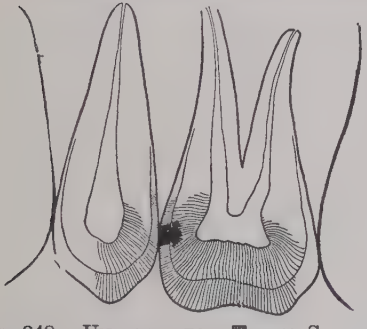


FIG. 248.—UNCARED FOR TEETH SHOWING DECAY ATTACKING DENTINE. (*Dental Summary.*)

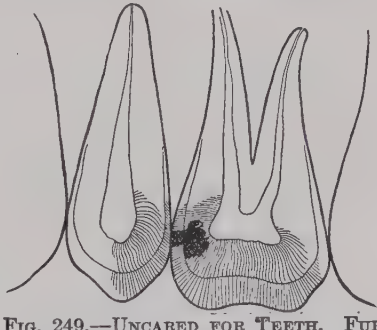


FIG. 249.—UNCARED FOR TEETH. FURTHER PROGRESS OF DECAY—TOOTH BEGINS TO ACHE. (*Dental Summary.*)

the socket. From this area the germs go into the neighboring lymph glands. In the lower jaw the glands most frequently infected are those just below and just to the side of the chin. These glands seem to be almost in the floor of the mouth.

Another set of glands that get infected through the teeth and their sockets are those at the angle of the jaw.

The infection can also travel into the cavities opening off the nose—the antra. Most of the cases of so-called catarrh are due to chronic infection of these antra and some of these cavity infections are due to absorption from the teeth. Among the infections that may get in by this route are tubercle bacilli. When these locate in the glands of the neck the condition is known as scrofula.

Scrofula was called in the old days "king's evil." In human history kings got into the field before dentists. Had the dentists got the spotlight first scrofula would have been known by another name than king's evil. The kings would have had first call on the dentists and the poorer man's teeth would have been the routes of infection.

However, the possible infections through and around the teeth are not limited to tuberculosis. Colds, scarlet fever, diphtheria and measles—in fact, pretty nearly every infection can travel this route.

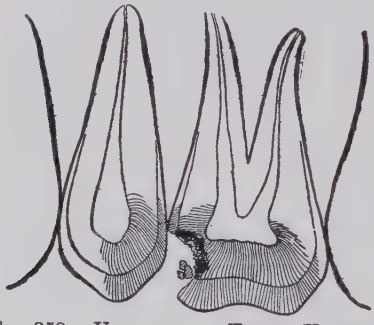


FIG. 250.—UNCARED FOR TEETH. UNDERMINING AND BREAKING DOWN OF THE ENAMEL WALLS, EXPOSING LARGE CAVITY WHICH HAS BEEN FORMING, UNSUSPECTED, FOR MONTHS. (*Dental Summary.*)

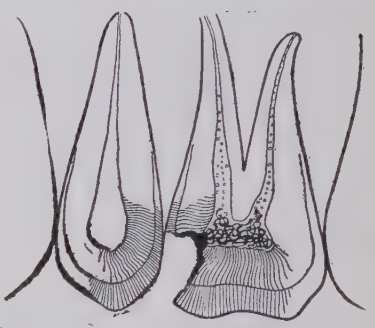


FIG. 251.—UNCARED FOR TEETH. DEATH OF DENTAL PULP OR NERVE. FORMATION OF PUS AND GAS IN PULP CHAMBER. (*Dental Summary.*)

The finger of probability is pointing toward bacteria as the cause of rheumatism. There are as many kinds of rheumatism as there are kinds of catarrh. Two of them seem to be due to infections through the mouth—ordinary acute inflammatory rheumatism and some forms of rheumatoid arthritis. It is especially in rheumatoid arthritis that the indications point to the teeth as the route of infection.

Nobody has been able to say just why teeth decay. We know that they decay in youth rather than in maturity; that young people lose their teeth from decay, old people from pyorrhea; that decay is more liable to start on certain surfaces than on others, in certain teeth than in others. A few facts like these are known but certain important facts are still unknown.

It is generally held that the teeth decay because the lactic acid bacilli produce acid which eats out the lime salts. There are more than fifty kinds of germs in the human mouth and many of these are alkali producers. The saliva is often alkaline because the alkali producers are in excess.

Hopkins found that about one-fifth of the mouth bacteria are lactic acid producers. He could never grow these bacteria so that they would make more than one-half of 1 per cent acid. On the other hand, he kept teeth for months in one-half of 1 per cent lactic acid solution and they were not harmed by it.

While the scientists are at work on these problems of chemistry and bacteriology the man whose job is to keep his teeth sound and in his head can succeed by following the simple plan of keeping his teeth clean and having them inspected by a dentist twice a year. Following this plan, no infection at least will go through his teeth.

Of more importance from the health standpoint is pyorrhea—the disease which deprives grown people of their teeth. It has much to do with ill health. In this disease the teeth are loose and the gums are sore.

To chew well is out of the question. The food must be bolted; nothing else is possible. On top of this there goes more or less systematic poisoning from the suppurating, discharging gums.

It is possible, as Rhein suggests, that several different conditions are called pyorrhea. Not infrequently the disease is developing just at the time when it is natural for the ridges around the teeth's sockets to begin to absorb and disappear.

There are two schools of scientists on the pyorrhea question each school fighting for its position. One contends that the important condition is a gouty or some other sort of a constitutional state; the other that the important condition is an infection.

Here, too, the man who wants to keep his teeth has a line to cling to. If he will have his teeth periodically examined his pyorrhea will be discovered in the early stages and it can be cured or held stationary for twenty years or more, which comes to nearly the same thing.

In late pyorrhea the gums are inflamed and pus sockets burrow down by the side of the root of the tooth. There are dentists who go down into these pockets and clean them out. Some even go so far as to take the tooth out, clean it and stick it back.

Many of these late cases of pyorrhea can be cured but it takes time and money. It is like late consumption—somewhat curable but only for those with fortitude and patience.

The proper plan is to watch so systematically as to detect the disease when cure is within the reach of all—when cure is cheaper than plates and bridges.

The teeth make up a part of the facial neuralgia equation. Sometimes the pain of facial neuralgia is felt in the teeth even when they are sound. Sometimes the cause of facial neuralgia is found in the teeth.

The nerves of the teeth come off the same stem as do those of the other structures of the face. Their hurts will not stay separate.

Unfortunately as we go hunting around for relief from pains in the face we frequently turn the wrong doorknob. We go to the office of the physician when we should go to the office of the dentist and vice versa.

We are made to feel the desirability of Magitol's dogma. All dentists ought to be doctors and all doctors ought to be dentists. In facial neuralgia, Prinz says, we are apt to join sincerely in this wish of Magitol.

IMPORTANCE OF GOOD TEETH

Infection can get into the body only through the mouth and nose. To this statement there are a few exceptions, albeit very important. Bacteria

do not remain long on the smooth, free surfaces, for food, drink and air sweep them away. It is in inaccessible places, in pockets, corners and crevices, that they get a chance to multiply.

Everybody has read of the absorption from pockets in tonsils and adenoids and the cavities which open off the nose and throat. Few have thought of the teeth as harborers.

It is not by absorption that bacteria in teeth cavities do harm, for while teeth can take up stains the power of absorption is so slight that it may be forgotten. The germs multiply in tooth cavities and recesses from which they are carried by food into the stomach causing disturbance of digestion, and by the saliva to the outside, spreading infection. Whether a man is an infection spreader is in part determined by the teeth he keeps.

I suppose nothing is more natural than to blame someone else or something else for one's own shortcomings. In consequence indigestion and dyspepsia are charged up to foods when they should be charged to the feeders. Almost anybody can eat anything which is clean, wholesome and fresh, provided he will limit the quantity eaten, take plenty of time to eat and keep his mouth and teeth always clean. It is the method of eating rather than the things eaten which causes indigestion—aside from those cases which are due to mental impulses—and a part of the method of eating is the condition of the teeth.

About the best cleaning they get is from polishing by food, in which process bacteria from the cavities and food particles, decomposing for hours or days in the cracks, are swept down into the stomach. The stomach being pretty capable takes care of itself under ordinary circumstances but every now and then trouble results.

Clean teeth, free from cavities, are attractive. They do not decay or become painful so promptly as dirty teeth; they are not so prone to harbor infection; and, on top of all this they do not pass harmful substances into the stomach.

Food can be chewed with decayed teeth but it takes more time. We so begrudge the time needed to eat with good teeth that we are certain to unduly hurry the job when we try to eat with poor ones. In consequence we swallow food which is not well broken up.

Now the gums are set with "ivories" devised for the purpose of breaking up food, while the stomach is a simple, muscular bag. A few minutes of tooth work will break up the food more than hours of stomach work.

One thing is certain—the food must be broken up, and the only question is whether a few additional minutes will be consumed in doing this efficiently with the teeth or an hour or more consumed doing it inefficiently with the stomach. A man's indigestion is largely determined by the teeth he keeps.

Still decayed teeth are not the most frequent cause of faulty chewing and faulty chewing is not the most important result of decayed teeth. Teeth are especially prone to decay in childhood—just the time when the jaws are developing and taking shape—and their premature loss causes the jaws to develop irregularly and the uppers and lowers not to meet so as to make a good chewing surface—the most important cause of poor digestion.

CARE OF TEETH NECESSARY

Man having learned to soften his food by cooking is not so good a chewer as some other animals; in consequence his teeth and gums do not automatically keep themselves as well as those of other animals—all of which means that the man who leaves the care of his mouth to automatic agencies loses his teeth.

In this narrow sense human teeth are not the best. But nature has endowed him with knowledge and judgment to compensate him for his loss in other directions. *The man who cares for his teeth with judgment and diligence keeps them better than does any other animal. The combination of human brains and teeth is the fittest and the best.*

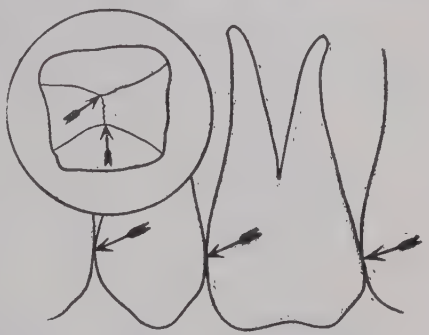


FIG. 252.—POINTS USUALLY NEGLECTED IN BRUSHING TEETH AND WHERE DECAY BEGINS. (*Dental Summary.*)

It is a far stretch from the enamel with 96 per cent inorganic matter and 4 per cent water and organic matter combined to a soft, pulpy organ such as the spleen which is nearly all water and organic matter. The peculiar chemistry of the enamel means that it is very resistant to bacteria as well as all sorts of chemicals.

CAVITIES IN TEETH

When acids and alkalies derived from food are eliminated from the causes of decay of teeth nothing remains but bacteria. There are more than thirty varieties of bacteria naturally in the mouth. They are not present when a baby is born but they begin arriving very soon and are present ever after. In addition to those which are universally present, so to speak, there are others such as the pneumonia and diphtheria bacilli which are present in some mouths but not in others.

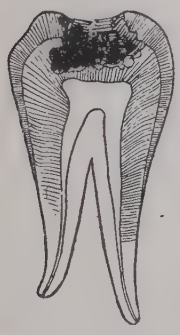


FIG. 253.—GROWTH AND MULTIPLICATION OF BACTERIA IN SUCH A TOOTH. (*Dental Summary.*)

The ordinary bacteria secrete alkaline substances which do not harm the teeth; but there are a few acid producers and these cause decay. The enamel being composed of inorganic matter will not support germ life. Therefore they must live on food remnants. A little bit of food refuse or food detritus lodges in a crack, fissure or some shielded place and into it some acid-producing germs find their way.

They grow and secrete acid and when this dissolves the enamel a cavity results. The larger cavity means more detritus, more bacteria, more acid and more decay.

The point to the story is that decay comes from acid acting in one place: acid comes from germs; germs feed on food detritus. Moral: If the teeth are kept microscopically clean there will be no decay.

Decayed teeth, like swollen tonsils, mean an advanced process. The cavities must be cleaned out and filled just as the tonsils must be removed. But the wise procedure with each is to keep the mouth so clean that the process will not advance to the stage where filling or cutting will be required. This means cleaning several times a day with toothpicks, floss, powders and soaps.

The ordinary brushing cleans the parts of the teeth which do not need it much since eating is so efficient as a good cleaner. Cleaning means emptying the pockets, the little crevasses, the fissures—these are the places which count—and do the best one can, periodic cleaning by the dentist will be required.

Commonly adults keep their teeth clean enough to hold decay down. It is children that need dental care. Theirs are the teeth which should be daily picked, flossed, brushed and polished, and which periodically should be gone over by the dentist. Above all, care should begin with the first set of teeth because when these drop out before their time the result is some sort of a twist in the jaw. *Children would gain if mothers would put some of the time on washing the teeth that they now put on washing faces and ears.*

IRREGULAR JAWS

Once there was an old woman who could not be thankful for riches or looks or anything else worth while and yet determined to thank the Lord for something she said: "I have but two teeth, but, thank heaven, they meet."

When teeth do not meet properly they are not satisfactory to chew on; food is commonly swallowed without being thoroughly chewed, chewing does not clean them even average well and they are more prone to decay. The pressure of chewing falls on them at improper angles and, therefore, they are more apt to become loose and, eventually, to be the seat of pyorrhea.

All in all, teeth are more secure and digestion averages better when the teeth meet normally, each tooth striking the exact place in which it belongs. If any one is out of that position an eighth of an inch the system is spoiled, the links in the chain disarranged.

The system in the human mouth is more complicated than in that of the lower animals. The animals which eat vegetables have one kind of teeth throughout. If a tooth in the upper jaw strikes the wrong tooth in the lower jaw it still strikes its kind. The animals which eat meat have but one kind of teeth throughout. But in man teeth for vegetables are near to teeth for meats and when the bite is wrong it may throw teeth adapted to tearing in opposition to teeth adapted to grinding.

When an engineer starts a tunnel from the both sides of a mountain and so calculates that the tubes meet just as planned the world applauds as it should; but that is simplicity itself compared with the plan by which the jaws of a forming child start from separate centers and grow in a complicated way until they reach exactly the right positions. It is expected that this development will work out right and when it does nothing is said. When it fails we search for something to blame.

It is after the child is born that the jaws go wrong. Summer complaint,

contagious disease, enlarged tonsils, mouth breathing, thumb sucking, scurvy, rickets, syphilis, decay—these are the things which cause jaws to overgrow, undergrow or to grow irregularly. A wise dentist looking in the

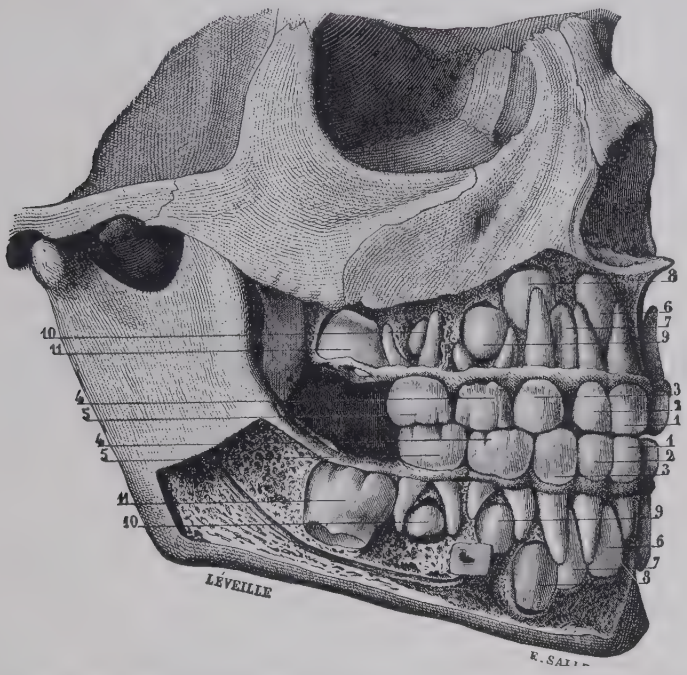


FIG. 254.—TEMPORARY AND PERMANENT TEETH: 1, 1, temporary central incisors; 2, 2, temporary lateral incisors; 3, 3, temporary canines; 4, 4, temporary anterior molars; 5, 5, temporary posterior molars; 6, 6, permanent central incisors; 7, 7, permanent lateral incisors; 8, 8, permanent canines; 9, 9, permanent first bicuspids; 10, 10, permanent second bicuspids; 11, 11, first molars.

mouth can tell just when the blighting illness or neglect came and in many instances its cause. Of greater importance is his ability to regulate jaws and teeth so that they "meet."

EROSIONS

There is a very peculiar condition of the teeth called "erosions" which is not of much consequence but which I am writing about because of its peculiarities. Occasionally it causes a tooth to fall out or to break off but generally it does little harm. It causes a furrow near the gum margin and running parallel with it. This triangular furrow, about one-tenth as deep as the tooth, is thick and usually runs in a straight line across several teeth. It is not a decay and it does not result in pyorrhea. It comes in those who have been undergoing severe nervous strain—financiers in times of panic and soldiers in time of war.

A tooth is simple in its arrangement. In the center is a pulp carrying a few blood vessels, a few nerves and a little tissue—like the marrow of

bone; around this is the dentine, a bony mass having few vessels, few nerve filaments, few cells, few spaces, and these of small size—changing a little, but very little; set over this like a cap is the enamel—hard, resistant, negative to everything, with few cells, small spaces, no vessels, no nerves and incapable of change.

Now teeth are supposed to be as immutable as the mountains; as they erupt so they remain. But they are not so changeless as is generally believed. The orthodontist moves them around over considerable latitude. The dentist treating pyorrhea may pull one out, clean it, and put it back.

As the enamel wears the underlying dentine and the pulp becomes dense, the nerves, vessels, cells and spaces disappear, the worn surface of an old tooth has a dentine and pulp zone as eburnated, hard, shiny and bony as enamel. The fact is that the teeth adjust themselves to their work just as does everything else.

In the light of this the furrows which worry may plow in teeth and which we call erosions, are not so difficult to understand as they were when we regarded teeth as Gibraltars. Nevertheless, among human diseases erosions remain the great mystery—the Egyptian sphinx—which tells us some things but leaves us much to guess.

PYORRHEA

For a long time the man with pyorrhea notices that his gums are softer and flabbier than they once were; and between the gums and enamel the necks of his teeth can be seen. In this stage cure is easy. The patient goes to his dentist who cleans the teeth not only above the gums but as far down the roots as a deposit is found, after which the patient keeps the teeth and gums well rubbed. The art of cleaning and rubbing the teeth he learns from the dentist.

The next stage is that in which the teeth are loose, the gums are flabby and more of the neck is exposed. In this stage the disease is curable but more time and care is required.

In the last stage the gums are soft and spongy, the teeth loose, and pus oozes up beside the roots. Cure is now difficult. The added factor of pus infection makes treatment much more complicated and greatly decreases the possibility of cure.

See how the parallel with consumption continues: after the consumptive has got a pus infection of his lungs on top of his original disease cure is impossible or for it long, patient and expensive open air treatment is required.

Even after the teeth are so loose that they can easily be moved by the fingers and pus oozes from around the roots thorough removal of all deposits from the roots and applications to the gums followed by banding of the teeth so that they cannot rock will be effective—except when the bony socket has been absorbed.

There are those who think constitutional diseases such as gout, rheumatism, diabetes and senility have much to do with pyorrhea and there is some truth in these ideas. There are those who believe pyorrhea is a cause of rheumatism and other constitutional diseases. But pyorrhea usually can

be cured without paying much attention to the constitutional state and it is important enough to stand on its own base.

The important thing to know is that spongy gums falling away from the teeth with deposits below the gum margin mean pyorrhea which, taken care of then and rightly, can be cured but which, neglected, means toothlessness—before the period of "lean and slippered pantaloon, sans eyes, sans teeth, sans everything."

ANEMIA AND DIRTY TEETH

The surgical operating room is a perfect machine. From operating surgeon through assistants, nurses, instruments, walls, floors—all down the line the technic and equipment spells 100 per cent efficiency. What efficiency engineers talk about is seen in daily operation in the highest grade surgical amphitheaters.

The technic of asepsis in the surgical ward is not 100 per cent, as in the operating room, but it is much nearer so than is that in the medical ward. Time was when the surgical ward reeked with pus infection and from it infection extended over into the medical ward. Now the surgical ward is aseptic and the effort is to prevent infections overflowing from the medical ward.

From sources here and there is heard a plea that medical cases be surrounded with the same aseptic conditions that prevail in the case of surgical cases. Of these was the argument of Hill before one of the meetings of the Canadian Public Health Association, that infection would lessen as cases of infectious diseases, scarlet fever, diphtheria and the like were treated aseptically.

The strongest plea that I have read is that of William Hunter of England. His argument is for clean mouths—oral asepsis. He does not discuss the theory that a dirty mouth promotes the decay of teeth. That needs no argument—nor that diphtheria, scarlet fever and similar infections are spread by the mouth secretions.

His argument is that the continued absorption of such bacteria as staphylococci and streptococci and their secretions from tartar accumulations around the teeth and from pockets in the gums is responsible for rheumatism, joint troubles, heart troubles, stomach troubles and severe anemia.

Any physician will tell you that William Hunter is a world authority on severe anemia. In his argument he cites a list of cases of profound anemia, some of which would be called pernicious anemia, which were due to foul mouths and which got well when the mouth was kept clean.

In some of the cases the absorption of pus was from some pocket other than the mouth. One was a case of catarrh due to an accumulation of pus in the frontal sinus. One was a pus absorption from a pus pocket in the lung in a case of consumption. But oral sepsis as a cause overshadowed all others.

TOOTH BRUSHES

In the spring of 1913 Dr. Anglemire, then a contagion inspector in Chicago, now health officer of Saugatuck, Michigan, was sleuthing an epidemic of diphtheria in a Jewish orphan asylum. He caught Abe C. spreading

the disease. Abe was innocent of wrong intent. His sore throat was just an ordinary everyday sore throat so far as ordinary appearances went but cultures from his throat showed that the cause of his ordinary sore throat was diphtheria bacillus.

Dr. Anglemire had had several years of sanitary training, so he stuck to the trail. In the boys' toilet room he found the tooth brushes of 100 boys arranged in regular order. It was decided to make a culture from Abe's tooth brush. Diphtheria bacilli were found.

In the meanwhile cultures from the throats of every child in the school had been made. Diphtheria was found in the throats of twenty. Investigating, it was found that the twenty tooth brushes nearest Abe's belonged to the twenty boys whose throats harbored diphtheria bacilli. Cultures showed that there were diphtheria bacilli in twelve of these brushes.

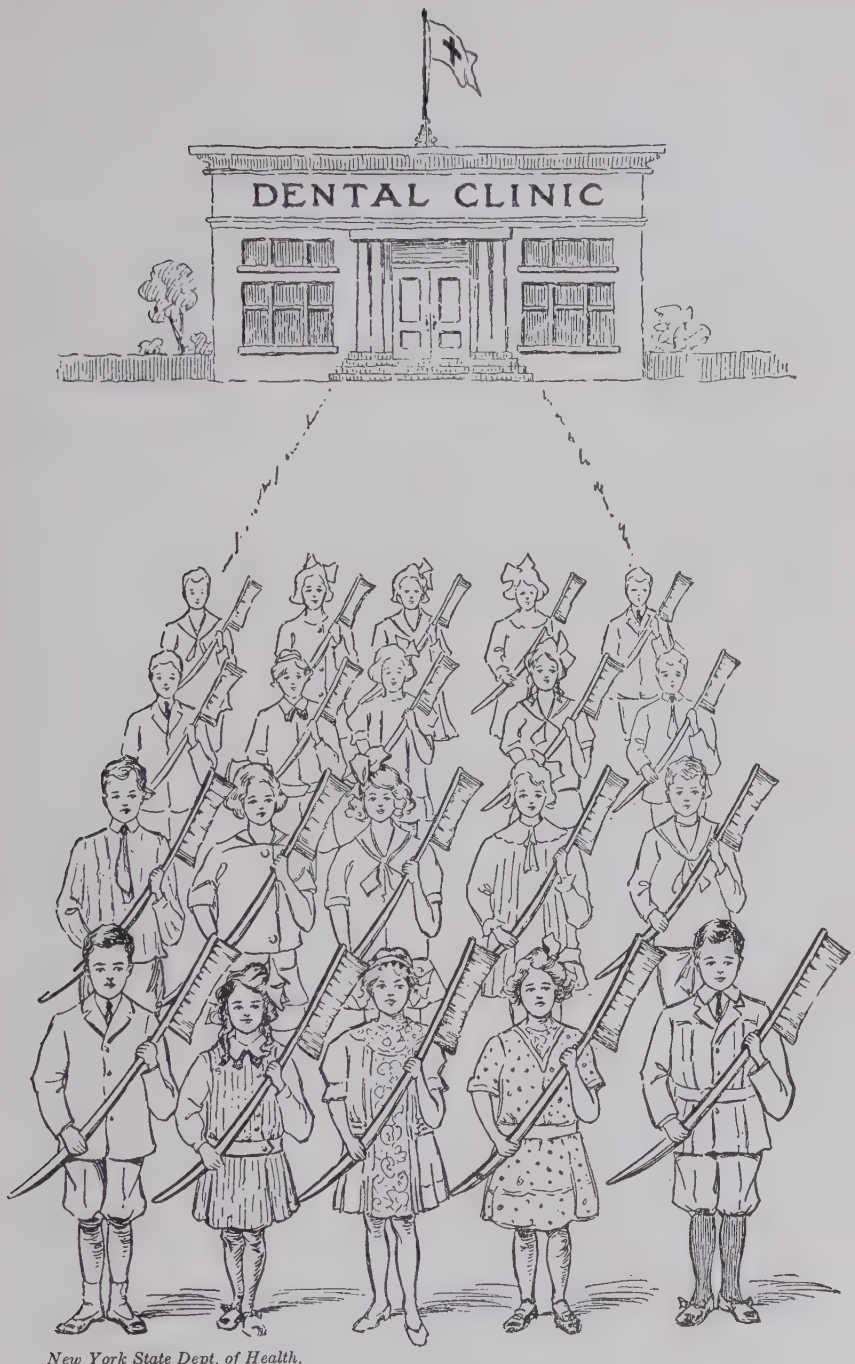
Maybe the brushes gave the disease to the boys and maybe the boys gave the disease to the brushes. Dr. Anglemire thought that the fact of the infected brushes being so closely bunched was proof of the brushes. In addition Dr. Anglemire thought that "in the bristles of the brushes were the media and moisture, and the steam heated room had the proper temperature for bacterial growth." He recommended the following method for caring for tooth brushes. (The method would be a good one for your tooth brush and mine.)

"A simple, hygienic method of keeping a tooth brush would be, first, to keep it clean and free from débris, boil it occasionally; or better yet, sterilize it. An easy way of doing this would be to procure a one-quart jar, or a glass candy jar, cut a piece of blotting paper to fit in the bottom of the jar. About once a week saturate the blotting paper with a teaspoonful of formalin, place brushes inside, bristle ends up. By this method you can have a sterile and sweet smelling tooth brush.

"There appears to be another advantage in this: As formalin is a tissue hardener, it will be found that the slight traces present upon the bristles deposited by the fumes will abort easy bleeding gums. The brushes should be rinsed after taking from the jar, as too much formalin would be harmful. It is also possible that the presence of a small quantity of formalin upon the brush each day also may be a deterrent to the terrific onslaughts of pyorrhea alveolaris, from which most everyone suffers."

Pyorrhea Curable Disease.—*M. J. B. writes: "My dentist has been treating a molar, which has been loose for several months, but only lately discovered pus organisms. The upper front teeth are separating, and there is a slight discharge from the lower gums in front. He tells me that he can do nothing, for pyorrhea cannot be successfully cured. Is this correct? Is it a systemic disease? I went to see a specialist who says that while the molar will never be a sound tooth he can save it for years and cure the others. He asks $100, which seems an exorbitant price, especially if it cannot be permanently cured. My experience with specialists in medicine has not given me confidence in high-priced men. Is the percentage of persons troubled with the disease high?"*

Reply.—Pyorrhea is a curable disease. However, long neglected pyorrhea cannot be cured. It is the results of neglect which are incurable rather than pyorrhea. It is a local disease. It is not systemic. It is



New York State Dept. of Health.

FIG. 255.—FIRST AND SECOND LINES OF DEFENSE AGAINST DENTAL DISEASE.

responsible for most of the loss of teeth in grown people. It affects sound teeth and those with cavities without discrimination.

The way pyorrhea progresses is as follows: As people grow older the bony processes which hold the teeth to the gums absorb to a slight extent, whereupon the gums do not grip the teeth as firmly as before. Saliva oozes down into the spaces left. From it small concretions form both above and below the gum line. These lime deposits irritate and inflame the gums and in consequence they pull away from the teeth and leave increasing room for deposits.

Bacteria are always all around the teeth even in health. When there are irritated gums, deposits and cracks everything has been made ready for bacterial infection. Therefore the next stage in pyorrhea is the pus stage characterized by pus welling up to the gum margin from the sockets of the teeth.

Pyorrhea Not Contagious.—*E. A. B. writes: "Will you please tell me what is pyorrhea? Is it curable? Is it contagious?"*

REPLY.—1. Pyorrhea is a chronic inflammation of the gums. Falling away of the gums from the teeth characterizes it. Early in the disease deposits occur on the teeth, the bony processes around the teeth are absorbed, pus oozes up from around the roots and loosening of the teeth occurs.

2. Yes, in early stages; in late stages, no.

3. No.

Pyorrhea Often Factor.—*J. B. writes: "Would the removal of apparently healthy tonsils be a benefit in a case of rheumatoid arthritis? Would pyorrhea be a factor in producing it?"*

REPLY.—If the absorption is taking place through the tonsils they should be removed. Pyorrhea is often a factor. Have the physician in the case diligently search for the point where infection is entering.

Pyorrhea Cures.—*Reply to C. C., C. A. W., and others:*

Each of you knows of a remedy which has cured a case of pyorrhea. The pyorrhea cures seem to be nearly as abundant as the consumption cures. Perhaps there is the same reason. These diseases are frequently curable, sometimes spontaneously, sometimes with ease, sometimes with difficulty. In consequence almost everybody knows of a cure and if it happens that some particular treatment was used that treatment is given credit for the cure. To draw conclusions from a single experience is always likely to mislead. Karl Pearson says that about 6,000 experiences are necessary to eliminate error. While this may be unattainable more than one is necessary. Better go early to your dentists and persist in doing what they tell you to do.

Bleeding Gums.—*Miss S. S. writes: "Please advise me how bleeding gums can be cured. I have gold crowns in my mouth which bother me. When there isn't bleeding there is a rather bad taste, seemingly coming from beneath the crowns. What will cure this? The mouth is kept clean, but no amount of scrubbing and rinsing will correct this tendency."*

REPLY.—Bleeding gums may mean pyorrhea or scurvy or some one of a few other conditions. Aside from what it may mean the condition is of

no consequence. Go to your dentist and have him find out why your gums bleed and then have that underlying condition attended to.

Unclean Dental Tools.—*A Citizen of Chicago writes: "I went into a dentist's office a few days ago to have some work done. I noticed the tools were not clean. I would not sit in the chair until the tools had been thoroughly boiled. The dentist informed me that out of some sixty of his fellow dentists there were only about three who had a method of boiling for disinfecting the instruments, and that many of them never attempted to do aseptic dentistry."*

REPLY.—A person who notices that his dentist's methods are not cleanly should change his dentist. Clean dentists are easy to find; dirty ones should not be supported.

Decaying Teeth.—*E. H. S. writes: "I have been troubled for two years with decaying teeth, and, considering the habit of care for them instilled in me by my mother since infancy, I cannot understand this except that my teeth are not so hard as they should be. I am 25 years old. Is there too much acid in my system, and if that is the cause, what should I take to correct it? Also are there foods which will harden my teeth at my age?"*

REPLY.—There are no medicines that you can take. All you can do is to keep your teeth clean both through your own efforts and those of your dentist.

Pulling Wisdom Teeth.—*H. L. writes: "1. Should gas be taken to have two wisdom teeth pulled? 2. What should I do to remedy dullness of hearing, lost sense of smell, and tenderness of upper air passages? I am not able to go to a specialist."*

REPLY.—1. You can have your teeth pulled without gas but it will hurt unnecessarily. Gas is safe and wisdom teeth are well rooted.

2. Beyond question you have an old, long-standing infection of your upper air passages. If you have allowed it to continue until your "hearing is dull and your sense of smell is lost" you cannot be wholly relieved. If you cannot pay for the treatment go to the nose clinic at the medical college nearest you.

Some Good in Fletcherizing.—*Mrs. P. W. writes: "I noticed an article headed 'Fletcherizing as a Preventive for Pyorrhea.' Would you please tell me what fletcherizing is, as my teeth get loose and fall out?"*

REPLY.—Fletcherizing is chewing food until it is thoroughly masticated. Fletcher advises that chewing be kept up until the mixture slips down the throat semi-consciously—as saliva usually does. It will be of some service in pyorrhea though it will not do away with the necessity of having the roots of the teeth cleaned.

Consult Your Dentist.—*C. D. C. writes: "Almost at will I can draw blood from some place in my mouth or throat. I have tried to learn whether it comes from the throat or gums, but am not certain, although I think it comes from the gums. My mouth is seldom free from canker sores under the tongue, on the roof of the mouth, inside the lip, or on the gums. Sometimes a period of a week or ten days will elapse without a*

canker. The sores last two or three days and disappear. I am in fine physical condition, as far as I know. There is no trouble whatever from the stomach. The bowels are regular, and I take plenty of exercise. I had appendicitis about two years ago. What do you think is the matter? What causes the sores in the mouth, and from where does the blood come?"

REPLY.—Canker sores mean a badly balanced diet. You must change your eating habits. Just how is for you to work out.

Bleeding from the gums may be due to scurvy, which also results from a badly regulated ration. It may be due to pyorrhea. If so you are probably in an early and curable stage. Have your dentist examine your mouth.

Go to Dentist.—*Mrs. B. J. writes: "How about the care of teeth of pregnant women? I understand there is a preparation to counteract an acid secreted in the mouth during this period which is harmful to the teeth. I have asked my physician what precautions I should take to preserve my teeth, and he advises just keeping them clean and being more particular than usual about brushing them. I would appreciate your advice on this subject, as I am now six months pregnant, and, if not too late, will take further precautions if necessary."*

REPLY.—In the main the advice is good. Frequent and careful cleaning is the proper plan. However, go to see your dentist, have him put your mouth in order and then see him again about your teeth at least once during the next three months.

Hardening the Teeth.—*M. L. writes to E. H. S.: "I saw your letter to Dr. Evans in regard to soft and decaying teeth. I was once afflicted as you state. I took to eating whole wheat bread, well chewed nuts, and fruits freely and I noticed at once a marked change in my teeth for the better. They became hard as flint. I have cut out all sweets save honey from my diet, as well as all flesh foods, and I clean my teeth thrice daily. I have used this diet for fifteen years, and at 74 am pronounced in many ways similar to men twenty years younger."*

REPLY.—This suggestion of M. L.'s may help some who have soft teeth and bad gums.

Keeping the Mouth and Nose Clean.—*R. F. D. writes: "I have made a practice for some time of gargling my throat and rinsing out my mouth, night and morning, with a solution of about 25 per cent of peroxid and 75 per cent of water, the idea being to offset the effect of any germs which may be taken in with the dust of this disgustingly dirty city.*

"Is this good practice? Is the solution used effective for the purpose, and is it harmless?

"I also wash out the nasal passages with clear, warm water, using a douche which is operated by placing one tube in the nose and another in the mouth, blowing gently on the latter. This causes the water to go up one side of the nose and out the other, without getting into the throat.

"Is here any objection to this form of douche? Is it good practice?

"Would salt water or some antiseptic fluid be better?"

REPLY.—The plan which you have adopted is excellent. It is just as

necessary to keep the mouth clean as it is to keep the face clean. Most infections occur through the mouth and nose and any reasonable effort to keep these clean is advisable. The solutions which you use are good.

Consult Your Dentist.—*H. G. R. writes: "What causes a brownish (sometimes reddish, resembling blood) discharge from my mouth while sleeping? I have noticed for a year or more that my pillow is so stained every morning. My general health is excellent. This discharge cannot originate with my lungs. I have suffered from catarrh for many years."*

REPLY.—The blood is not from your lungs. It is probably from your gums. Have you pyorrhea or scurvy? Have your dentist find out. If not it is probably a chronic infection or subinfection of your nose or some cavity opening into your nose.

Loose Teeth.—*E. S. writes: "I have three or four teeth in the lower jaw which are loose. They are not decayed. Have tried several drug store remedies. Is there anything that will tighten them?"*

REPLY.—You have pyorrhea. Drug store remedies cost money and are useless. A good dentist may be able to clean, scale and anchor those teeth and thereby save them for you for several years. Pyorrhea is like consumption, easily curable in the early stage and incurable after years of neglect.

Sore Gums.—*W. E. L. writes: "About three months ago my physician told me that I had symptoms of a gum or tooth trouble called pyorrhea. He advised me to consult a specialist and I did so. This man did nothing but clean my teeth apparently. My gums ache seriously when I chew my food and my teeth feel sore. My throat also feels a bit sore sometimes when eating. If you will let me know what is the matter with me I will thank you."*

REPLY.—Your gums might be sore from neuralgia. If a physician who saw you said you had pyorrhea, that probably is the cause of your pain. Talk with the dentist who saw you and get his opinion as to whether you have pyorrhea. If you have it you need something in addition to one simple cleaning.

May Save Teeth.—*A. B. C. writes: "I have had the same dentist continuously for twenty years and he sees my mouth two or three times a year. Several months ago I discovered that my gums were becoming diseased and called his attention to the matter. He told me that the trouble was invariably incurable and that there was nothing for me to do. So I was greatly surprised to read your statement that pyorrhea is easily cured in the early stage. None of my teeth is at all loose, but in several places the gums are receding somewhat. Please tell me what I can do to cure or to arrest the disease."*

REPLY.—Ask your dentist to send you to some dentist who treats pyorrhea or to take counsel with some pyorrhea dentist as to the proper course for you to pursue. By starting care early you will save your teeth.

Tumor of Gums.—*Miss H. S. writes: "Immediately back of where my two front teeth join there is a tiny cleft in the roof of my mouth, which has*

been there ever since I can remember. For several months it has been sore and seems slightly swollen. It bothers me considerably when eating and I have difficulty in biting anything but soft food. It is in the way when my mouth is closed. My lower jaw fits so that my front lower teeth just rest there, but it is so painful I have to bring the lower jaw behind it. Should I ask a physician to clip it off, or do you think it will eventually lose its inflammation and cease to bother me?"

REPLY.—I judge you mean there is a little projection there. Projections at this point are frequent. The two plates forming the roof of the mouth grow together there and in consequence defects and errors occur. Have a dentist or physician remove the little tumor.

Lime Water and Gums.—*Reader writes: "Is it advisable to use ordinary commercial lime in water so that it may be used by the tablespoonful in milk and bread for hardening loose teeth?"*

REPLY.—I presume you mean for the purpose of hardening your gums and making your teeth immovable. If so no form of lime will be of service. Have your dentist clean the roots of your teeth and anchor them wherever possible. Have him treat your gums at the same time.

Fletcherizing as Preventive.—*B. L. D. writes: "In reading your article 'Pyorrhea Curable,' I became very much interested, as I had a very bad case of it. All my teeth were loose, and two fell out during the night, but now my teeth are as strong as ever. March 16, 1911, I was taken to a hospital and was confined there until June 9, 1911. All they gave me to eat was milk toast, soups, cereals, weak coffee, and stewed dried fruit. I spoke to the chief physician of my trouble, but he ignored it. I consulted my dentist on my return home, but did not have the money to spare for treatment at that time. The last week in August I made a business trip to Battle Creek, Michigan, and there met an ardent admirer of Horace Fletcher. He invited me to his house for supper. I could not refuse, so accepted the invitation. They had for supper beef tenderloin with mushrooms, potatoes, lettuce salad, dessert, and black coffee. Being humiliated on account of my teeth, I said, 'Here goes, if all my teeth fall out.' Doctor, I never enjoyed a meal so in my life. I had been craving for meat, but could not chew it. I learned to fletcherize that night, and today I can eat anything."*

REPLY.—Fletcherizing will do much to prevent pyorrhea. I doubt if it can be relied on to cure well developed cases.

Treatment for Pyorrhea.—*G. writes: "Please give me some remedies for pyorrhea and ulcers of the mouth."*

REPLY.—1. Pyorrhea—Dentists cure pyorrhea by painstaking attention to the gums and teeth, supplemented by vaccines or emetine according to the case. Where bony processes have been absorbed the teeth must be lost.

2. Ulcers of the mouth result from eating an ill balanced diet. When the diet is readjusted the ulcers quit coming.

THE HAIR

BALDNESS

Baldness, premature and permanent, is caused by the hat.

It is not due to the weight, texture, stiffness, or heat of the hat so much as it is to the fact that the hat girdles the head like a band interfering with the circulation of the blood and starving the roots of the hair.

Baldness can be prevented. Doubtless it will be prevented when it comes to be generally understood that the hat commonly worn by men and boys is the cause practically of all the premature and permanent baldness of the male sex. Frequent reference to the hat as the cause of baldness is made in the literature of the subject but not in a way to reach the public.

The blood supply necessary for the growth and nutrition of the hair is received by the scalp between the skin and the bony skull, principally in front of the ears and also at the sides of the forehead and behind the ears.

That some men are bald and others are not although all wear hats is due to the difference in the shape of the head. Baldness appears to be peculiar to some families while others are exempt. This gives rise to the idea that baldness is hereditary. It is the shape of the head that makes the difference and it is the shape of the head that is influenced by heredity.

Some heads are so cone-shaped that a hat fits like one length of stovepipe over another making pressure not only on the sides but all around the head. This class becomes bald most frequently and earliest. Other heads are so shaped that the pressure of the hat does not come upon the blood vessels on the sides of the head. These do not become bald or at least do not become so until the nutrition of the hair bulbs is impaired from some other cause.

I have observed that the heads that are full in front of the ears and with rounded foreheads are most frequently bald. This is because the blood-vessels in front of the ears and at the sides of the forehead are subject to the pressure of the hat while the square forehead which only permits the pressure of the hat on each temple and on the back of the head leaves the sides free from pressure and the hair free to be nourished.

Every horseman knows that if a horse's tail be kept tied up for a week or ten days the hair at the end of the tail will fall off, and most of them know that this is because the blood circulation is interfered with. A wart may be made to drop off by tying a ligature around its base thus cutting off its blood supply; similarly if the blood supply of the scalp is cut off the hair will fall out.

Baldness begins in the area where the blood supply is weakest—usually at the top or upper back part of the head, because the pressure on the vessels in front of the ears (the temporal arteries) and on those at the side of the back of the head (the occipital) is most frequent. If the pressure be on the vessels above the eyes (the supra-orbital) the baldness will be of the "high forehead" type. Usually the head becomes bald above the line of pressure by the hat, but not below that line.

The foundation of baldness is often laid in boyhood, since pressure upon the blood-vessels at that time retards their growth and prevents their perfect development. This accounts for occasional baldness in the twenties. *The inference is that children should not wear any covering for the head except in inclement weather and then only a cap that rests upon the top of the head and does not grip the scalp.*

Women are less subject to baldness than men regardless of the shape of the head; first, because their "crowning glory," more luxuriant than that of man, forms a cushion which protects the scalp from pressure; and second, because a woman's headgear does not constrict the scalp but rests on top of the head.

The hat accounts for the baldness of men and the exemption of women. It accounts for the baldness of civilized men and the exemption of savages.

On reflection it seems that the hat is more for ornament than utility anyway. A good head of hair is all the protection that is required except in severe weather.

So-called "restorers" applied to the scalp to remedy hat baldness are useless. Rubbing the scalp with the fingers or a brush stimulates the circulation and is useful. Too much washing destroys the natural oil of the hair and renders it brittle.

Forms of baldness other than hat baldness may follow the debility caused by exhausting febrile diseases and local diseases of the scalp. It is, however, as a rule, temporary. Baldness in old persons is due to the impaired general circulation of the blood common to the aged. All baldness except hat baldness may occur in people of any nationality and in either sex.

Has Scalp Disease.—*J. R. H. writes: "I am 29 years old. For a number of years I have been troubled with a sore scalp, which has caused most of my hair to fall out. Now I am almost bald. I am troubled with dandruff, and when the scalp gets dry it is itchy. Also after using any hair tonic it gets so itchy that I am forced to pick dandruff out, causing the scalp to have red blotches. Please tell me what causes my head to be sore. Is it possible I have had some disease, and do not know it? My health is good."*

REPLY.—Evidently you have a scalp disease. Probably, though not certainly, you have seborrheic eczema. Mild cases resulting in dandruff can be cured by persistent cleaning and brushing and by using sulphur or resorcin ointment. You apparently have a more severe case and had better see your physician.

See a Skin Specialist.—*J. M. K. writes: "My hair has been falling out in spots for the last two months. It appears to be growing again, but of a decidedly light color. My hair is brown. Is this caused by a germ? Have had my hair clipped close. Will this help? Are any of the advertised hair restorers of any use? My health is good."*

REPLY.—It probably is due to an animal parasite, though sometimes other diseases cause it. You had better see a skin specialist.

Care of the Hair.—*Jo writes: "Is there any truth in the assertion that dry salt copiously sprinkled over the scalp and vigorously and frequently brushed through the hair promotes its growth?"*

REPLY.—No. The same amount of plain brushing and cleaning would do just as well.

Bald Head.—*Subscriber writes: "Should a bald-headed man have his head covered while sleeping in cold weather in a small bedroom with the window open?"*

REPLY.—In very cold weather, yes. In ordinary weather, no.

Care of the Hair.—*Reader writes: "My hair is falling out rapidly. I am advised by friends to apply a weak salt water or brine about twice a week. If I use this regularly will it be beneficial? What proportion of salt to water?"*

REPLY.—It will be all right if you will use it thoroughly enough to keep your scalp clean, will use a little grease afterward, and brush your hair frequently and well. In other words, care will save your hair. Salt water washing will be a part of the care given. The proportion is not a matter of consequence. Use a tablespoonful to a pint of water.

Dandruff.—*E. H. writes: "What is the cause of dandruff, and how can it be cured?"*

REPLY.—Dandruff is a variety of seborrheic eczema—the skin disease, possibly bacterial in origin, which is responsible for much of the premature baldness. It is a mild condition which if neglected leads to loss of hair but if cared for usually yields to treatment. It can be cured by frequent washing of the scalp followed by mild greasing. The hair must be brushed frequently and well.

To Remove Dandruff.—*L. M. writes: "Will you kindly tell me of a scientific method for removing dandruff?"*

REPLY.—Avoid sources of infection such as toilet articles in common use, and keep the scalp clean. To keep the scalp clean wash it two or three times or even more each week with a good tar or sulphur soap. Corrosive sublimate soap may be used on an unbroken scalp.

In some cases the free application of alcohol will cleanse sufficiently. If the alcohol leaves the scalp and hair too dry add five or six tablespoonfuls of castor oil to each pint of alcohol. After the scalp is cleansed a resorcin or sulphur lotion should be applied and well rubbed in.

Superfluous Hair.—*Mariak writes: "Please advise me what to do to stop growth of hair on my chin. A few months ago only two or three hairs grew out. These I pulled out and was advised to use peroxid and ammonia as a remedy, but this only stimulated the growth."*

REPLY.—Nothing stops it except the electric needle and that does not succeed unless it is used so as to kill the hair bulb. Pulling them out makes them worse.

Removal of Superfluous Hair.—*C. B. writes: "Will you advise if, in your opinion, the use of the electric needle for removing superfluous hair from the face is perfectly safe—that is, if scars are apt to result or any growths form under the skin after its use, or is there any other suggestion you could offer in the way of removing these hairs permanently?"*

REPLY.—When in the hands of a skillful operator no scars or growths will follow the use of the needle for the removal of hairs.

Bald in Spots.—*Reader writes: "About a month ago three little bumps, each the size of the tip of the little finger, appeared on my head. They were sore to the touch. I have just noticed that one of these bumps has gone completely bald. Is there any danger of all my hair coming out? What would cause the bumps to appear? I am a woman of 22."*

REPLY.—You will not lose all your hair in any event. Alopecia areata is a disease which causes the hair to fall out in spots. Ringworm is another. Have your physician tell you which you have and what to do.

Bald Spots.—*A. C. writes: "I am 23 years old and for the last three months my hair is coming out in bunches. Please let me know of any remedy that will cure it."*

REPLY.—If you mean your hair is coming out in patches you should see a skin specialist. Bald patches may be due to any one of several skin diseases each of which is of consequence.

Thin Hair.—*M. K. writes: "Is there anything one can do to make the hair grow thick? My hair is thin and oily."*

REPLY.—I doubt if anything can be done. If you mean that your hair was always thin certainly nothing can be done. If it has been gradually falling out you can stop it by washing, brushing and rubbing it well.

Gray Hair.—*E. P. H. writes: "I am much interested in the replies on gray hair. Can it be that, considering what medical men and scientists have done and are still doing for humanity, what seems to be much simpler is baffling them? The majority of people go through the greater part of their lives with gray hair. Cannot someone solve the problem?"*

REPLY.—Members of certain families turn gray young. To avoid marrying into those families is one thing that can be done. The next most important cause of gray hair in relative use is worry, anxiety and emotion. To live with equanimity is another thing that can be done. The subject of gray hair, these two factors being eliminated, becomes the same as senility.

Measures effective for the postponement of senility are effective against gray hairs. These are embodied in a normal, wholesome life, lived from childhood up. Medicines to change the color of the hair are dyes by whatever name they are called. To dye the hair is to cheat. If a man is prematurely gray and is discriminated against on account of gray hair he is being cheated. The remedy is to carry his birth certificate and not to dye his hair.

Why Does Hair Turn Gray?—*N. W. writes: "What is the cause of hair turning gray at 30? My health is good, I am not given to worry, and it is not hereditary that I know of, yet my hair is rapidly turning gray. I am trying massage with vaselin, but it does not seem to help any. Do you think that the taking of iron and sulphur internally would have a tendency to stop the graying?"*

REPLY.—No, as to iron and sulphur. Nothing will stop it. Metchnikoff found that white blood cells entering the hair roots caused it to turn gray.

This is a step toward an answer but not an answer. The next question is, Why do the white cells enter the roots?

Hair Turning Gray.—*M. D. writes: "What can I do to prevent my hair from turning gray? Does it come from the blood? Am only 24 and anemic. My scalp is scaly and sore."*

Reply.—Get your scalp in good condition and keep it so and you will do about all that you can do to keep from turning gray. Wash your scalp frequently—every day or three times a week until you get rid of the scales. Rub in a little grease after washing. If you have much dandruff probably a sulphur ointment will be better than a plain grease. Spend some time each day brushing your hair. The condition of the blood has no especial influence on the hair. Anything that profoundly influences the nutrition including profound anemia will affect the hair; slight anemia will not.

Keep Hair Clean.—*M. E. writes: "I am 30, and my hair is becoming white. Would you have the kindness to tell me how I can bring back my original dark hair?"*

Reply.—There is nothing that you can do except wash your scalp often enough to keep it clean and brush your hair frequently and thoroughly, using a little grease if required.

Nothing except dyes "brings back" the color and they do harm.

Hair Dyes Injurious.—*C. B. writes: "1. Are preparations for the prevention of gray hair or coloring injurious to the eyesight? 2. Can you prescribe a wholesome hair preparation? 3. Is it better to discontinue the use of these preparations at once or to do this gradually, and let the hair be restored to its natural color? 4. Is a glass of salt water before breakfast helpful?"*

Reply.—1. No, but they are otherwise injurious. Read the article in "Nostrums and Quackery" (published by the American Medical Association) on hair dyes.

2 and 4. No.

3. At once.

Dyes Not to Blame.—*Interested Reader writes: "Would the use of a hair dye or one of the so-called hair restorers be any cause for, or in any way relate to the extremely nervous condition of a person, such as sleeplessness, irritability, etc.?"*

Reply.—I have heard of inflammations of the scalp and severe headaches from the use of these advertised hair dyes but never of sleeplessness, irritability and a nervous condition. I do not think the use of the dyes is responsible.

Wash Scalp Daily.—*Young Subscriber writes: "What causes the terrible itching of the scalp, especially when one gets out under the sun? I am in my twenties, and my hair is gradually losing its color, turning gray. Can you suggest a remedy?"*

Reply.—You have a scalp condition which you should remedy by care of your scalp. Wash your scalp well with soap and water every day. If

the hair is too dry rub in a little grease after washing. Brush your hair thoroughly with a clean brush several times a day.

Little Absorbed by Scalp.—*B. writes: "Will you kindly tell me whether the use of cantharides as an ingredient of a hair tonic could lead to any injury to the health?"*

REPLY.—None. Very little will be absorbed.

CHAPTER XLII

The Feet

CARE OF THE FEET

Several years ago when a certain city made a physical examination a part of its civil service test for positions on the police and fire department, it was found that a rule against flat foot practically barred negroes from the service.

Inquiry as to the ability of whites and blacks to walk and stand without discomfort did not show the same disproportion. The conclusion was that flat foot is not so disabling as is generally supposed. When the test of the arch of the foot by impression on paper is made in a routine way it is found that *there are lots of people with high arches and painful feet and lots of people with flat feet who suffer no discomfort.*

Now whenever the calf muscles cramp, pain, ache or tire easily or the feet burn or hurt something is the matter with the feet. On the other hand when the foot is flat one must go slow about announcing that the foot is inefficient or predicting that painful feet will ultimately develop.

In the problem of the feet there are many elements that enter in besides the arch. There are twenty-seven bones and all the ligaments that tie them together, a lot of muscles and many more tendons, a multitude of blood vessels and a myriad of nerves, for the foot is a regular meeting of the ways. Think of the tracks in the most complicated railroad yard you ever saw and then remember that all that complication of rails is simplicity itself as compared with the trackage of the foot.

If in the railroad yard a single rail slips six inches out of its groove, trouble results. If in that foot yard a nerve slips a fraction out of its groove or the bone tilts a wee bit wrong trouble results.

I have sometimes wondered why those men who were building up schools of medicine around pinched nerves did not use the foot nerves as the basis of their theory since foot nerves are so frequently pinched, pressed upon and "nagged." Instead they use the nerves coming from the spine—nerves that are buttressed like one of Scott's armored knights.

The practice is to cramp and bind the feet for years until the twisted toes, displaced bones, atrophied muscles and lax ligaments make a condition past remedying and then to attempt some superficial, ill considered remedy too tardily for any good result.

The real remedy is to encourage children to go barefooted wherever hookworm will permit; to encourage them to wiggle their toes and to take exercises that will develop the calf muscles and those lower down; to study where the shoes wear (both heels and soles) for what we can learn of the foot mechanism that we seek to conserve; to study the toeing in or the

toeing out to discover whether it means wrongly made feet or whether it means that the trouble is beyond the feet in the legs.

As most of the people now complaining of their feet were children in the 70's and 80's, years when men were thinking a great deal about the Hottentots but little about their own feet, most of the sufferers will exclaim:

"Advice to wiggle the toes and exercise the calves is all right; but our toes will not wiggle. How about metallic arches?"

Such people know that they can never score 100 but would like to know if insole arches will help them to make 50.

A foot arch held up by a metal arch tends constantly to get weaker. Its muscles become flabby, its fat absorbs and its tendency is downward. Nevertheless some people require a metal arch. Those who can get relief from felt pads had better do so.

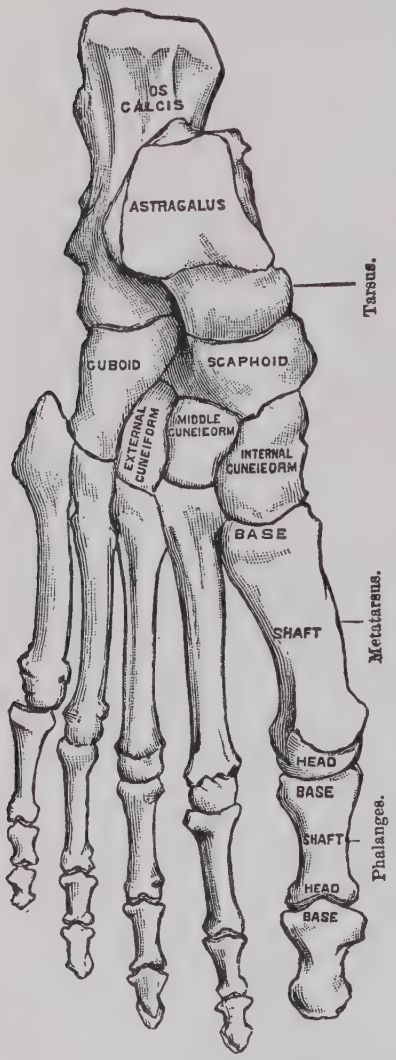


FIG. 256.—BONES OF RIGHT FOOT.

"SLEW-FOOTED" OR "PIGEON-TOED"

Mr. Webster seems never to have heard of it but "slew-footed" is a common term for those who walk with the toes turned out. For some reason those who walk with the toes turned in are called pigeon-toed. Notice people walking the streets and you will find that a large percentage of them walk with their toes pointed out or in.

Every person unconsciously finds his own method of walking. You can be certain that however foolish it may seem for any man to go down the street walking slew-footed it is really the best way for that man to walk. For him to try to turn in his toes would mean speedy tire. On that basis, slew-footedness, his bones are shaped and set, his tendons are placed and his muscles developed. To walk according to one's bony parts is wisdom.

If you will inquire more closely you will find that athletes are never slew-footed. A slew-footed runner or a slew-footed jumper would be a seven days' wonder.

The meaning of this is that while walking slew-footed is the most efficient way for a slew-footed man to walk slew-footed people never walk,

run or jump at high efficiency. Their best is always below the other fellow's best; also their average is below the other fellow's average. Observation will convince you that the ordinary slew-footed man cannot walk so much without tiring excessively as can the average man.

I have sometimes thought a military training made for slew-footedness. The soldier is required to keep his heels together. As his shoulders are broad, this makes his base much narrower than the shoulder zone five feet above the ground. No animal ever stood that way naturally since the upward climb from the Stone Age began.

FIG. 257.—SHOE TO PREVENT OR CURE BOW-LEGS IN CHILDREN. (By courtesy of Best & Co., New York.)

FIG. 258.—"TOE-IN" SHOE. (By courtesy of Best & Co., New York.)

The natural way to stand with the heels separated several inches and thereby with the base line broadened. But the army men having decided on "heels together" the base line must be broadened somehow so out go the toes. Gradually the mechanism of the feet and legs come to adjust themselves to the basis of "toes out." This, however, is not of much consequence.

Usually military life does not catch the men young enough to change the mechanism greatly—at least not army life. It should make a difference with those boys who are going through a preparatory school where they have military discipline.

FLAT FEET

The work of the heel is to bear the weight of the body. The work of the toes is to push it forward. In order that the toes may work to the best advantage and that the nerves, tendons, muscles, and blood vessels under the bottom may not be pinched with each step there are arches in the foot. One is the instep; another less well known is that at the ball of the foot running across from the big to the little toe.

When these arches are not just right, muscles and ligaments are put under improper strain and the bones, joints, nerves and blood vessels are pinched. There is not only aching feet and legs but tire of the whole body. *A smallpox epidemic comes once in thirty years but every night thousands go home all worn out from tired, aching feet.*

FIG. 259.—ANKLE AND ARCH SUPPORTING SHOES. (By courtesy of Best & Co., New York.)

In maintaining the arches the muscles are the key to the situation. Flabby, weak foot muscles have more to do with broken arches than stretched tendons. The muscles concerned are those which wiggle the toes. This being true the way to prevent flat-foot is to develop the muscles which move the toes.

Now toes are becoming useless, rudimentary, distorted. Painful feet, broken arches and "flat-foot" are increasing at the same rate. A shoe with a high heel tends to break down the foot arches because it pitches the weight from the back where it should be carried to the ball of the foot, where it causes undue strain and tire. If, in addition, the toes are pinched or the ball compressed the arch is almost certain to give.

FIG. 260.—PRINT OF FOOT WITH HIGH INSTEP (A) AND PRINT OF FLAT FOOT WITH PINCHED TOES.

FIG. 261.—WEAK FEET—SEEN BEHIND.

The method of preventing flat-foot and of curing it in its earlier stages follows:

1. Children should be allowed to go barefooted or to wear sandals. The foot muscles—those which move the toes—must be kept vigorous, strong, in use and under control.

2. Adults must build up their foot muscles by walking, running, jumping and also by room exercises which bend the foot and particularly move the toes.

3. The shoe heels should be low, flat and broad; the toes wide and the shoes roomy enough so that the foot can give naturally as the heel catches the weight and the ball pushes the body forward.

If you would avoid tired feet keep your toe muscles in good condition.

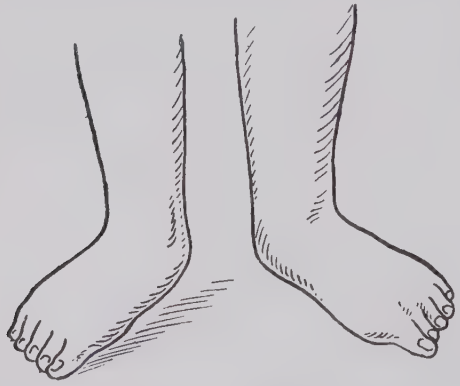


FIG. 262.—WEAK FEET—SEEN IN FRONT.

LOW HEELS

The girls are walking low now. Maybe they have given heed to all this talk about foot arches and painful feet. Maybe the writer who told them that high-heeled shoes were making the toes do what the heels should do has been heeded. And then maybe not.

However, why discuss the reason for it? The fact is here—the correctly dressed girl is wearing a broad soled, no heel shoe.

The present type of shoe is a good one but the change has come about too suddenly. There will be a reaction. When a person has walked on high heels for years the bones have become adjusted to the position.

When the rear end of the long heel bone is raised the front end is pitched downward. The leg bones come to sit on the forward, slanting surface. The foot bones in front of the heel bone join the heel bone at a new angle. Much of the weight of the body is carried to the toes without the accustomed spring.

The ligaments readjust themselves; the muscles and tendons lengthen or shorten as needed. After this mechanical adjustment has been working for a long time it cannot be suddenly changed without causing trouble.

FIG. 263.—A, PRINT OF NORMAL FOOT. B, PRINT OF FLAT FOOT.

When the heels are left off the shoes the rear end of the heel bone drops down an inch or more. The pitch is backward, at least it is more so than it was. The facets of the bones must readjust themselves. New facets must be fashioned, and while the process is going on the bones move on each other with some friction and heat—and pain.

FIG. 264.—MODIFIED THOMAS HEEL.

The length of tendon and muscle required is not the same for the two positions. The muscles running from the calf to the sole are not quite long enough.

In consequence the girl tires easily. As a result of fatigue the muscles of the calf ache or spasmodically contract from time to time.

The change for the time results in loss. To bring about the same result by gradual change is another matter. To have lowered the heel bit by bit, giving the muscles time enough to elongate, and the bones time to readjust their facets gradually, would have been wise.

There is not the same objection to the rapid widening of the sole but there, too, something would have been gained by a more gradual change.

The quarrel, then, is not with the change but with the suddenness of it.

FOOT HABITS

As age advances and the weight increases a naturally normal foot may and generally does become worked out of shape. A foot that is constructed to bear a weight of 130 pounds must yield in time, if the weight is increased to 200 or 250 pounds, and become more or less flat.

With increasing years and weight the necessity of toeing out to maintain the balance while standing is apt to become the habit so that in middle life most people will toe out too far in walking. This brings the strain of raising the heel on the inner and longer side of the foot and makes an undue strain upon the tendons that support the arch. It also turns the large toe in and in time the joint of the big toe becomes enlarged from the strain and projects inward toward the other foot.

The spring of the foot in walking should be on the outer and shorter side of the foot for the reason that the smaller and shorter bones of the foot

are more elastic and springy and the motion of raising the heel requires less effort.

In running one unconsciously toes in so as to take advantage of the shorter and more springy part of the feet. To toe in, then, is the natural and correct way to walk. Toeing out is a habit and one that should be avoided and can be corrected by giving the subject attention.

FIG. 265.—SHOES SHOULD HAVE A BROAD TOE. A line from the inner side of the front of the great toe along the inner side of the ball to the inner side of the heel should be straight.

With this knowledge we can understand why high heels give a degree of comfort to the flat-footed. They throw the weight on the outer and smaller bones of the feet and take the strain off the arch on the inner side of the foot.

The natural way to walk is barefooted, and in considering footwear for a normal foot the one thing to consider is to so arrange the shoe or stocking that the tread of the foot and its natural action will not be interfered with. This probably will take us back to the moccasin of the aborigines, to the sandal of the Orient or to the sneaks of the children.

The shoemaker should make the shoe with the sole broad enough for the bottom of the foot to rest on a flat surface instead of having the outer edges of the foot on a rounded surface as is the case when the sole of the shoe is not so broad as the sole of the foot.

Trouble comes to many from wearing stockings that are too short and too small, which constantly prevent the spreading of the foot when the weight is put upon it and which tend to curl the small toes under. They are frequently as much to blame for corns and for ingrowing nails as the shoes.

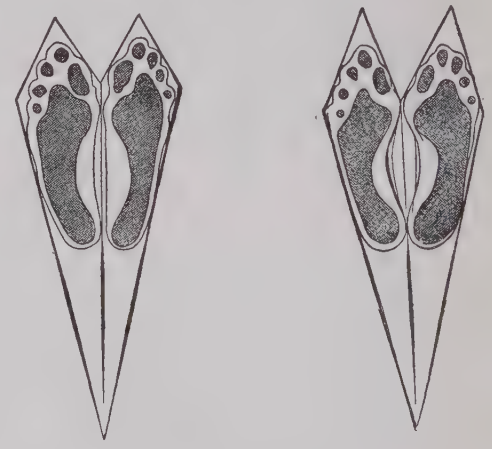


FIG. 266.—A HARMFUL, NARROW-SHAPED TOE.

COVERING OF THE FEET

Whether the lodging-house inmate be a tramp or a seasonal worker, if he be wise he will keep himself equipped with warm socks. Yet Flynt

tells us that the tramp's poorest equipment is with footgear, both shoes and socks. He frequently has no socks, and when he has them they are full of holes and dirty.

The key to the man's situation is his feet. For one thing he uses them a good deal. For another, they frequently "go bad on him." When he rides on the bumpers or in a freight car in winter he is liable to freeze his feet. When he gets to middle life he is always a hobbler.

FIG. 267. — TOES PRESSED OUT OF POSITION, WEAKENING BOTH THE INSTEP AND THE BALL OF THE FOOT.

Keeping equipped with water-tight shoes is not an easy job. One can always pick up shoes on dumps and in alleys but such shoes are not water-tight.

The lodging-house man will do well to do the best he can as regards shoes. Whenever he can he should wash his socks. When the socks are wet or their mesh is filled with dirt the heat of the body travels from the skin through the socks and shoes to the ground almost as fast as though the feet were bare.

One cannot be expected to make heat enough to warm the ground. Clean, dry socks hold the heat in; so the lodging-house man should spend some time in keeping his socks clean and dry. If he cannot get hold of socks he should try to wrap his feet in some warm, dry, clean cloth. Sometimes he can get a piece of oilcloth or a piece of paper worked in in such a way as to help.

FIG. 268.—A NARROW-TOED SHOE AND THE NATURAL SHAPE OF THE FOOT WHEN SUPPORTING THE BODY.

A newspaper is of great service in "keeping out the cold," especially when the wind is blowing. Spread on a floor, it keeps out cold air. Slipped in between garments, it keeps the wind from blowing away the warm air from next the skin and replacing that warm air with cold.

Clean clothes are warmer than dirty ones. Every lodging-house now has some facilities for bathing and some of them have a tub or so for the men to wash their clothes in.

If the feet get nipped they should be thawed out slowly with as much rubbing as they will stand. The skin must not be broken. For chilblains the feet should be plunged frequently into cold water containing salt or a little ammonia or bathed with kerosene oil; they should be dried thoroughly and rubbed gently; and should be dusted with talcum powder.

Woolen stockings should not be worn and the feet should be kept away from heat. The feet should be painted with two coats of iodin, the first coat being allowed to dry thoroughly before the second is applied.

Aching Feet.—*Reader writes: "What causes one's feet to burn at night when to the touch they do not feel hot? The feet pain generally in the ball of the foot, also at the heel, and standing is painful during this time."*

REPLY.—Have your urine examined to exclude Bright's disease, a frequent cause of swollen feet. Have your heart examined to exclude heart disease, another frequent cause. These having been excluded, there is left "painful foot," an unpleasant condition and one difficult to remedy.

It seems to me most of the cases result from improper care in childhood and youth and the condition as it presents itself in middle life cannot be remedied. The feet have not been encouraged to grow. Rather they were cramped in the years of growing. In consequence they are not large enough to carry the weight of the body. Tight shoes have caused a loss of power over the toes. The toe muscles have atrophied. In consequence of this group of influences the foot bones slip just enough to pinch nerves. Your only hope of relief, as I see it, is through a good shoemaker and physical culture. Perhaps some reader can offer help to this considerable group of sufferers.

Broken Arch Remedy.—*Mrs. O. B. wants to know if tight shoes break down the arch. What can be done for a broken arch?*

Reply.—The important arch is the instep arch. In the natural arrangement the heel carries the weight. If the shoe heels are high the weight pitches forward to the ball of the foot. If the ball can spread out this shifting of the weight is taken care of; if the shoe pinches it is not so easily cared for.

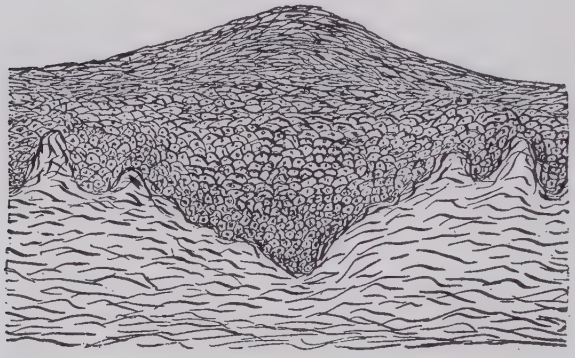


Fig. 269.—Cross Section of a Corn.

If the toes are pushed, distorted and pinched around the arch is endangered; first, because in any arch, if any of the elements, even those at the ends, are displaced or changed the arch is weakened; second, because good muscles in the foot are necessary for a strong arch and many of the foot muscles have as their work the moving of the toes. When the toes, perpetually unused, become useless the muscles which work the toes also go out of business.

The remedy: Build up the general muscle system by exercise. Build up the foot and leg muscles by exercise. Wear shoes which are "easy in the toes" and support the instep.

Treatment for Chilblains.—*E. O. writes: "As soon as the cold weather approaches I am bothered with chilblains, or frosted feet. I have tried several things, but nothing has helped me. Kindly let me know how to get rid of this affliction."*

Reply.—Plunge the feet frequently into cold water containing salt or a little ammonia; or bathe with kerosene oil. Dry thoroughly and rub gently. Dust with talcum powder. Do not wear woolen stockings and keep away from heat. Paint with two coats of iodin, allowing the first coat to dry thoroughly before applying the second.

Danger in Using Acid.—*L. A. S. writes: "Is there any danger in using nitric acid in removing corns, for instance, on the little toes, and down fairly close to the bone, provided it is done gradually and without causing bleeding? Would blood blisters on the same toes be caused from the acid*

or from new patent leather shoes? Is it practical and a good way to remove corns by electricity?"

REPLY.—1. Yes, one would have to be quite skillful to remove corns with so powerful an agent and not do harm.

2. Might be due to either. Probably is due to acid.

3. Do not think so.

How to Cure Bunions.—*K. G. writes: "Please tell me what to do for inflamed bunions."*

REPLY.—Rest and hot foot baths followed by the application of hot compresses of witch hazel will afford immediate relief. If it is necessary to use the foot the first thing to be done is to wear a shoe large enough for five toes instead of four, with a straight line on the inner side. The application of camphor or carbolated salves on a piece of old linen protected by covering with rubber, chamois or buckskin washers will often afford relief. Where the pain persists and the affected part continues to enlarge it is wisest to consult your physician.

Bothered by Great Toe.—*B. F. writes: "Can anything be done to remove the tendency to bunion swelling beyond wearing of proper shoes? Such a tendency was started in my case by shoes a trifle short. Of course I abandoned these when trouble developed, but still have trouble. Are patent contrivances for the straightening of the big toe of use when there is no great deformity present?"*

REPLY.—1. A light splint to pull the toe inward, worn at night, and methodical manipulation of the toe together with massage of the affected parts will strengthen the muscles, hasten absorption and often restore normal conditions.

2. In selected cases especially it is desirable to force the toe inward; a toe post may be used to advantage. I advise you to get expert help. You can scarcely work it out for yourself or with general directions.

For Tender Feet.—*E. J. C., M. D., writes: "You ask suggestions as to what to do for painful feet. I have a patient who is wearing the first leather shoes he has worn for over twenty years. I took him to a shoe dealer and had him buy a pair of shoes three sizes too large. Then I directed the cobbler to cut out a pair of insoles from cowhide, and cut or scoop out holes in the insoles to match the enlarged tender places."*

REPLY.—This suggestion is excellent. I have written and will write again on the harm of tight shoes and the advantage of loose shoes. In addition to the advantage of looseness your plan gains a soft, padded sole surface.

For Perspiring Feet.—*A. B. writes: "I am troubled greatly with perspiring feet, accompanied by an offensive odor. It necessitates a change of stockings every day and keeps my feet, around the toes, tender and sore. What is the probable cause of this, and could I do anything to benefit it?"*

REPLY.—Wash the feet night and morning with soap and water and rinse. Then apply freely a solution of alcohol and salicylic acid in the proportion of one quart of alcohol to one tablespoon of salicylic acid. Where the condition results from some disturbance in the general health have your family physician find the cause and prescribe.

Effect of High Heels.—*M. S. A. wants to know how high-heeled shoes break down the arch. Also if carrying weight breaks down the arch, why do not toe dancers have flat feet?*

REPLY.—Nature intended the heel to carry the weight. High heels pitch the weight on the toes. Toe dancers have exceptionally strong foot muscles. All their muscles are strong. Broken arches are found in soft, flabby people, particularly, however, in people with rudimentary distorted toes and poor foot muscles.

Aid for Flat Feet.—*G. A. B. writes: "Is flat-foot and weak ankles hereditary and can it be cured?"*

REPLY.—No doubt there are inheritance factors in these conditions, but I do not know of anyone who has worked them out. I think that both flat-foot and weak ankles are as much dependent upon weak and poorly developed muscles as upon changes in the shape of bones. Proper exercises for the feet and lower legs and shoes that permit the toes to be moved and do not push, cramp and bend the toes are the proper means of prevention. Cure of cases where the condition is well established sometimes can be done but it is slow and tedious.

Reason for Flat Feet.—*M. C. writes: "Will you kindly tell me the best treatment for flat-foot or broken arch? Is the origin of the trouble rheumatic? Is it curable by the shoe made with arch support in it?"*

REPLY.—Rheumatism may be a contributing cause. Tight shoes is another. Poor muscle tone is a third. To prevent flat-foot follow the exercises given for the feet. To cure a broken arch is difficult. Arch supports may help some. They often relieve symptoms.

Wear Easy Shoes.—*Reader writes: "I am suffering from bunion and corn formation and don't find a quick remedy to relieve me at once and for all."*

REPLY.—Remove the excess of dead tissue with a knife or any of the corn removers. Wear easy shoes with cork insoles. That is all that you can do. Corns are a habit—a skin habit. The habit is incurable. The skin got the habit of thickening up because back yonder in the habit-forming days of youth you had the habit of wearing tight shoes. The only solution of the corn question is proper shoes before the corn days. You are doomed to hobble on. Do what you can to better things for your children.

Chilblains.—*F. W. M. writes: "About three years ago the toes on my left foot were frostbitten. One of the toes became infected, probably from the dye in the stocking. I consulted two reputable physicians, neither of whom gave me any relief. After about a year and a half the sore apparently healed of its own accord and for six months gave me no trouble. It has recently broken out again and seems to be spreading. It starts as a blister or cluster of blisters and the rubbing of the shoe irritates and breaks the skin, then it becomes a raw sore from which oozes a yellow liquid continually. It itches a great deal and burns when anything touches it or when put into water, either hot or cold. Will you kindly advise me what the trouble is and how to overcome it?"*

REPLY.—You have chilblains I should say. From time to time I advise the following for chilblains: Plunge the feet frequently into cold water containing salt or a little ammonia, or bathe with kerosene oil. Dry thoroughly and rub gently. Dust with talcum powder. Do not wear woolen

stockings and keep away from heat. Paint with two coats of iodin, allowing first coat to dry thoroughly before applying the second.

Itching Feet.—*Mrs. O. E. A. writes: "My father, aged 74, ill only once in his life and recently from acute indigestion, suffers horribly from 'burning' and itching feet. What can be done for him?"*

Reply.—Commonly the advice is to wash the feet in boracic acid water and then to dust them with boracic acid powder. The advertised medicines for aching feet are composed of boracic acid in the main. It has always seemed to me that it is the result of pinching and pressing the nerves and that arch supports, cushion soles, or easy shoes are a more promising plan. When tight shoes have been habitually worn the bones get pushed around into all sorts of bizarre positions and nerves that naturally run in protected grooves get jammed into exposed places.

Causes of Cold Feet.—*R. S. W. would like to know what to do for the trouble he has in keeping his feet warm. He says he wears heavy woolen socks and yet if the weather is the least bit damp or his feet get cold at all he is unable to get any life in them for a long while.*

Reply.—Cold feet may be caused by any one of several diseases. It would be good judgment for you to see your family doctor and have him examine you to determine whether there is any organic disease in your case.

If there is none you have nothing to complain of except inconvenience and there is nothing so good for inconvenience and discomfort as complacency.

The wearing of cork or cushion-soled shoes is a great help. But the principal thing to do is to make more heat and to get more of it in your feet.

This means active physical exercise. When the feet are cold deep breathing for a few minutes will put the body in a glow. The feet should be bathed in cold water each night. The cold bath should be followed by brisk rubbing.

Treatment of Feet.—*S. F. J. writes: "I have suffered for years from excessive perspiration and mattering between the toes. I have tried everything that has been suggested by friends, but to no avail. I consulted a chiropodist and he called the condition 'hoof rot,' and merely prescribed walking barefooted as much as possible. Will you give me the benefit of your advice?"*

Reply.—Walking barefoot is good enough but it cannot be made use of by many. Try the following: Wash the feet night and morning with soap and water and rinse. Then apply freely a solution of alcohol and salicylic acid in the proportion of one quart of alcohol to one tablespoonful of salicylic acid.

Change Style of Shoe.—*W. S. writes that he has noticed the soles of his shoes split at the instep. Does that mean his feet are out of shape?*

Reply.—It means that your instep arches too high for your shoes. The top of your instep pulls hard on the sole and finally splits it. The remedy is to wear shoes higher in the instep, for if the foot lifts hard against the sole the sole pulls down on the instep equally hard.

Cold Hands and Feet.—*J. A. B. writes: "What is the cause of a person having cold hands and feet continuously when the thermometer is below 70? During cold weather the finger nails and hands turn purple. I am twenty-four years old and have been troubled with this for four or five years. I am not a hearty smoker or drinker and do not keep irregular hours."*

REPLY.—If I were such a person I would get the advice of the best clinicians possible as to whether I had a modified mild form of Raynaud's disease.

Trouble with the Feet.—*E. K. writes: "I am troubled with my feet and at times it seems as if I am walking on the bones. I have corns and bunions. Do you know of any shoe that would give me relief?"*

REPLY.—The cause of bad feet goes back to improper shoeing of children and youths. Oliver Wendell Holmes said the proper treatment of a disease should begin with the patient's grandparents. The proper treatment of foot ills may not go back of the youth of the suffering individual. But the present is all we have in mind in your case. If loose shoes and cork insoles or soft insoles as a part of the shoes do not help you your proper founts of help are shoemakers who study the foot and then build a shoe to conform to conditions as they can best be conformed to or even conditions which have been rectified sometimes.

Need of Arch Support.—*W. F. V. writes: "What can be done for broken-down arches in the feet?"*

REPLY.—A simple remedy for a broken-down arch is to slip an arch supporter into the shoe. If this does not suffice you should see a shoemaker expert on apparatus—very much better, an orthopedic surgeon.

FIG. 270.—THE ROCKER SOLE (Whitman).

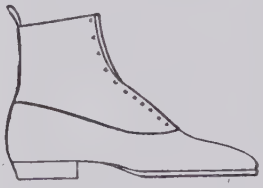


FIG. 271.—THE FLAT SOLE (Whitman).

Look Out for Heels.—*H. S. L. writes: "I have a very bad case of fallen arches; in fact, am flat-footed. I have pains in my insteps, and my right ankle pains me severely at times. I stand a great deal during the day. I wear arch supports. I would like to know if there is any possible cure. What would you advise me to do?"*

REPLY.—Be certain that your shoe heels are of the right height. Some people wear them too low, some too high. Get shoes which pitch your weight on the outside of the ball, rather than on the big toe side. Stand and walk pigeon toed. Nothing saves the arch more than to walk toeing in. Nothing strains it more than to walk toeing out.

Treatment of Cold Feet.—*O. C. B. writes: "I see that R. S. W. has been appropriately answered regarding cold feet, but let me add a bit of personal experience.*

"Several years ago I discarded woolen clothing next the skin. I sub-

stituted linen and cotton. On my feet I wear cotton socks, the year around, fleece-lined in the winter.

"Woolen absorbs and holds the moisture or perspiration of the feet, and so surrounds them with damp clothing, which is a promoter of chilliness. The leather clothing of the feet prevents a proper ventilation; hence low shoes are better than high laced ones. But in any case, cotton socks keep the feet in a drier condition.

"Every night and morning I rub my feet and legs some fifty times or more, taking care to rub up from the toes. There are valves in the veins which prevent the blood from going back to the extremities. Rubbing up draws arterial blood through the capillaries into the veins. This produces circulation and warms the feet.

"I find this rubbing of the feet has lessened the thickening of the toe nails and has reduced that numb feeling of the bottoms of the feet which is apt to come on with old age.

"As to shoes, I wear those that are roomy with low heels or with no heels at all. The tyranny of the high-heeled shoe is a wonder, especially among women. It is a question which is the worst—the bound feet of the Chinese or the high-heeled shoes of the American women, with the inevitable accompaniment of cramped, misshaped feet, and painful corns and bunions. Nature made the human foot to rest flat on the ground. We can't improve on the beautiful feet of a baby."

Cure for Sore Feet.—*P. S. writes: "Water sets my toes afire, if used too often and the toes are not dried thoroughly."*

To which A. F. replies as follows:

"For sore feet, such as scalding and cracking between the toes—keep clean, but do not wash oftener than once a day. Dry thoroughly between the toes. Drying is important. When ready to put the shoes on sprinkle powder between the toes and interlace white tape with the toes. Begin by putting the tape under the little toe, over the next toe, under the next one, till you run out of toes. This is to give space for air to circulate. The tape will not interfere in any way with walking. This cured my feet and may cure others."

Support the Instep.—*M. R. writes: "1. Kindly advise me whether it is inadvisable, in cases of flat-foot, to wear heelless shoes, such as gymnasium slippers. 2. Are there exercises which are helpful to the muscles in such cases?"*

REPLY.—1. Heelless shoes are no better than low-heeled shoes but low-heeled shoes are much better than high-heeled. After flat-foot has developed about as much as can be done is to support the instep.

2. Yes, in some measure. To prevent flat-foot, yes, in much greater measure. Exercise in which the toes and ankles are bent—rising on the ball of each foot at once, standing on the heels and bending the feet upward, bending the ankles backward and forward, exercising the toes—general muscular exercise.

Has Flat Feet.—*A. B. C. writes: "I am a girl of eighteen and have flat feet. My ankles are weak. The ankle of my left foot sticks prominently out, bending over towards the instep. Kindly let me know if there is a remedy for it."*

REPLY.—If a loose shoe and an insole do not relieve you (and your case is probably beyond their reach) go to see an orthopedic surgeon. Any one of the large hospitals has an orthopedic surgeon on its staff.

Best to Consult Doctor.—*Mrs. W. C. H. writes: "I am a woman 64 years of age, and for the last year I have been troubled with swollen feet and legs and pain in my back. The limbs are more than twice their natural size and very hard, and pain when I use them any length of time. Have been to two physicians, but they do not seem to know what to do."*

REPLY.—Swollen limbs may result from heart, liver or kidney disease. Have your physician find the cause in your case by examination of your urine, your heart and your liver. Have him tell you what to do for it, then follow directions. Nothing is gained by going from doctor to doctor. Much swelling of the legs in a woman of sixty-four is not to be trifled with.

Swollen Feet.—*J. C. writes: "What causes my mother's feet to swell at the instep and below the ankle, at various times, paining her dreadfully? She thought perhaps it was rheumatism. There are times when it is difficult for her to walk."*

REPLY.—Rheumatism or gout could easily cause a painful swelling in the instep and below the ankles. Don't try to take care of a case of inflammatory rheumatism or gout by yourself. Have your physician see her.

CHAPTER XLIII

Obstetrics

PRECAUTIONS AT CHILDBIRTH

A woman writes to know what can be done by those in attendance on a woman in confinement in case the baby is born before the doctor arrives. Let us assume that the mother has been told what to provide and what to do and has followed instructions.

When the earlier vague pains come on she should take a cleansing bath, put on clean clothes, and arrange her bed as she has been instructed. She should prepare a lysol solution, one teaspoonful to the pint, which she should use for local external bathing according to the instructions she has had.

It is advisable that she should restrain from bearing down. It is better to go slow. She must not take chloroform in the absence of the physician. The danger is too great.

The child having been born, is it advisable to cut the cord? If the child and mother are doing well do not cut the cord so long as it pulsates. If either the child or mother gets into trouble cut the cord at once so that attention can be centered where it is needed. To cut the cord tie it twice with a piece of sterile string.

The ligatures are tightly tied about four inches apart, the nearest being one inch from the child's body. Place a small piece of sterile cloth below the cord at the point of division and cut with scissors sterilized by boiling. When the head is born and the cord is found to be around the neck it must be drawn upon enough to permit it to be slipped from this position.

So long as mother and child are doing well there must be no interference. Let the afterbirth come away of itself. *Do not pull on the cord.*

If at the end of two hours the afterbirth has not come away a cloth wrung out of cold water may be laid on the abdomen. If this fails the uterus should be gently rolled between the fingers and thumb of one hand. Through the limp abdominal walls the uterus can be felt deep in the abdomen. It feels like a hard lump. The fingers are to be pressed down behind this lump while the thumb and hand extend over the top and front. Very gently squeezed but not shoved in any direction the uterus contracts and thus expels the afterbirth. The same method stops hemorrhage.

The woman must be watched for profuse hemorrhage, ordinary oozing requiring no attention. If there is such hemorrhage the foot of the bed must be raised and then the uterus must be grasped through the abdominal wall as described in the preceding paragraph.

After the afterbirth has been expelled the mother should be allowed

to rest for an hour or so if she wishes. Then she should be bathed with warm water at least as much as is required, dressed in clean clothes and a previously prepared aseptic pad applied. The bed having been put in order the woman is ready for a quiet nap.

Never touch a raw surface or a mucous membrane with the fingers or cloths that have not been made clean or aseptic.

The meat of the answer to the woman's question on what to do is to do nothing! Labor is a natural process. When something needs to be done the something needed requires more knowledge than untrained persons have.

TWILIGHT SLEEP

By reason of the publicity given twilight sleep it became necessary for members of the medical profession to mature their opinions or, where they had none, to form them.

Although the method was proposed in 1899 and many thousands of cases had been reported the method was not in general use. It was used in the main in large hospitals and the several thousand cases were in the services of a few men.

A moderate number of obstetricians and surgeons had visited Freiburg and studied its use there. Of these the larger part had made no extended use of the method when the publicity precipitated a demand for opinions. Everywhere physicians were being asked: What is your opinion on twilight sleep?

In an effort to supply the need medical societies have been holding discussions and medical journals have been collecting symposiums. A typical symposium is that in the *Medical Times* from which the following opinions are abstracted. Professor Lucke of Cincinnati wrote:

"I am much in favor of giving the method a thorough test. I think there is something in it. The term 'painless childbirth' is in a measure misleading. All of these patients suffer during labor, but forget about it afterwards."

Professor Polak of Brooklyn says:

"Adoption of the method will do much toward reducing obstetric morbidity if properly done and intelligently administered. It is in practice in private practice—that is, outside of hospitals."

He believes in giving morphin but once and continuing the effect by an injection of a half a dose of hyoscin every three or four hours. He thinks the harm to the babies is due to the morphin and if the dose of that drug is not repeated the babies get on all right.

Dr. Knife of New York reports that in the Gouverneur hospital for several months a large proportion of their maternity cases have been given twilight sleep.

"This has required considerably more attention from the staff physicians and nurses," he writes. "We have felt justified in devoting sufficient care to these cases because of the excellent results obtained both for the mother and child. . . . The method is practicable under proper conditions."

He discusses four questions and answers them essentially as follows:

As to the dangers to the mother his answer is that they are not of much consequence. As to the danger to the child his answer is that there is no especial danger that cannot be met.

"The child is subjected to extra hazard," he says. "If too much of the drug is given the labor will be prolonged and the child will suffer. The children's breathing is liable to be interfered with. However, by not pushing the drug too far, by close watching and prompt action, the danger to the child will be small."

The question: "Is the anguish and pain of childbirth of such a degree to warrant alleviation?" he answers in the affirmative. He says:

"Anyone who will compare the mothers who have had twilight sleep with those who have not had this aid must come to the conclusion that the absence of physical and mental exhaustion alone justifies the use of twilight sleep."

To the question as to whether the difficulties of administering the method are so great as to make it impracticable he answers no. In this answer he assumes that the cases given twilight sleep must be more closely watched than labor cases now are. The basis of his answer is that practically all babies should be born in hospitals. Groups of neighboring physicians working together may carry out twilight sleep in their private practice through coöperation.

Dr. Gellhorn witnessed the use of twilight sleep at Freiburg but was not sufficiently impressed by it to make use of it in his own practice.

Dr. Schloessing of New York, formerly of the Freiburg clinic, thinks that the fact that the Munich, Heidelberg, Inbengin and Dusseldorf clinics have adopted the Freiburg method is proof that it is safe as well as otherwise advantageous. He says:

"Women of today with their hypersensitive nervous systems are, as Prof. Kronig says, far removed from being natural and therefore we can no longer look on their labor as being physiological. The best proof of this is that out of one hundred women who are in labor ninety used to ask for chloroform and are now asking for twilight sleep."

Professor Dehee says:

"The drugs used in producing the twilight sleep carry inherent dangers which have not been completely eliminated, even in Freiburg. The general reëmployment of the method—discarded ten years ago and again seven years ago—will result in the repetition of the bad experience of those times.

"Practiced by specially trained obstetricians in a specially equipped maternity hospital with an abundance of trained assistants and nurses, the dangers to mother and child may be reduced to bring them to a point where one may well consider the advantages and disadvantages more nearly balance each other.

"Even under these circumstances one will have to reckon with a certain toll of infants' deaths and injured mothers. For general use—especially in the home—the drugs are contraindicated."

Professor Applegate of Philadelphia thinks the method has a limited place in obstetrics.

"It usually prolongs the labor from three to six hours," he says. "While the full treatment of three hypodermics of morphin and hyoscin

have been given not infrequently, the child is affected by twitching and stupor for a day or two after birth."

Where only one dose is given, whether because no more is required or as a starter for chloroform, he thinks much good and little harm results.

Professor Hirst of the University of Pennsylvania does not approve of it as a routine procedure. He has witnessed its use at Freiburg and tried it a few times in his own practice.

"Had it been a good method it would have spread throughout Germany and some outside," he says. "The Germans who have had the best opportunity to judge are not making wide use of it."

In the opinion of Professor Hirst, if enough morphin is used to put the patient to sleep both the mother and baby will be endangered.

Professor Booer of Washington thinks the method has a very limited place in obstetrics. He says:

"It demands careful, continuous, and tedious observation on the part of the obstetrician. I believe it endangers the welfare of the infants."

Dr. John N. Bell of Detroit says:

"I see no objections to the use of twilight sleep in well regulated hospitals."

Professor Charles M. Greene of Harvard opposes it because it endangers the baby and because the effect on the mother is uncertain.

Professor J. Whitridge Williams of Johns Hopkins reports that in neither of two series of cases in which it was used in Johns Hopkins hospital was twilight sleep satisfactory.

Dr. Charles B. Reed of Wesley hospital, Chicago, has informed me that they have used it in a series of forty-five cases without any accident to mother or child. As the method has advantages and as in their experiences there have been no disadvantages so far as the mother and child were concerned they advocate the method.

The twilight sleep method consists in the use by hypodermic injection of a freshly made solution of morphin and hyoscin. The dose of morphin given—one-sixth of a grain—is a small one. Larger doses than this are in common use. The dose of hyoscin given—one one hundred and fiftieth of a grain—is a small one. One one-hundredth of a grain is a frequent dose.

Assuming that the twilight sleep method satisfies the patient, why is there any objection to it? When morphin and hyoscin are combined in a single dose the effect is increased unduly. A small dose of morphin plus a small dose of hyoscin is greater than the effect of double the dose of morphin or double the dose of hyoscin.

In order to get a satisfactory result it is necessary to keep the patient in a state of contented somnolence for several hours. This degree of intoxication with the drug prolongs the labor somewhat and somewhat endangers the child.

Let us see how far the objections to the method hold against other methods. The method is not painless since the women suffer during labor but forget about it afterwards. This is an objection urged against chloroform and ether.

Either there is no register of pain or else there is no conscious recollec-

tion of such registering. The test here is the after shock. The observers generally agree with the opinion of Dr. Knife that there is absence of mental and physical exhaustion in those who have had twilight sleep as compared with those who have been treated otherwise.

As to the dangers to the child the authorities are somewhat divided. Among the authorities quoted above those who have had the most experience with this method place least emphasis on this objection. Clearly the weight of evidence is to the effect that there is added danger to the child. Being born is a hazardous occupation.

Between the accident rates of those born in high grade maternity hospitals and the accident rates of those born in the poorer homes there is a vast difference. The accident rate among babies born under twilight sleep is higher than the first and lower than the second. Where in between it comes no one can say. Accidents happen under other forms of anesthesia. Of a comparative statement of these risks I do not know.

Every authority quoted is agreed that morphin scopolamin should not be used except where there is a plentiful supply of nurses and attending physicians. This in the opinion of those quoted above comes to this: The method should not be employed except in equipped hospitals.

Now the pressure is coming from a certain group of women. That group is willing to go to hospitals or to equip their homes with nurses and doctors as their physicians direct.

The method was proposed as a method for surgical anesthesia in 1899. After it came to be used as an obstetric method it was twice abandoned. It will not down. This means that those who bear the pain are not altogether satisfied with chloroform.

Recalling Professor Kronig's statement that "women of today, with their hypersensitive, nervous systems are far removed from being natural" we feel that at any rate they do not approach pain or bear it with the stoicism of the savage.

Dr. Schloessing says: "Out of one hundred women who are in labor ninety used to ask for chloroform and are now asking for twilight sleep."

The women are as they are. A large part of them have fearful dread of the pain of childbirth. Twilight sleep puts the woman in a condition of somnolent content. When through she shows less signs of shock and fatigue than do those who have had chloroform and those who have had no anesthetic.

To a great many high-strung women the appeal made by this prospect will be mastering. The somewhat greater degree of injury to themselves and the definitely greater hazard to the child will not deter them. They will insist on twilight sleep. It will be the duty of the hospitals and their physicians to make the method safe.

It may be that it is now safer than the methods of obstetric service prevailing in the general run of poorly equipped homes. But that is no answer. The method must be made reasonably safe and the ordinary obstetric service in poor homes is not reasonably safe.

But there should be no great difficulty. There is nothing extraordinary about morphin and hyoscin. They are in common use.

Nervous, apprehensive, high-strung women will continue to insist on

twilight sleep and they will get it. The method will be modified to overcome its disadvantages.

CARE OF NEWBORN BABY

In a previous article I answered a correspondent who wrote asking what should be done in case the baby were born before the doctor arrived. The answer related what should be done to the mother.

What should be done to the baby?

If the child cries lustily upon arrival, breathes normally and appears to be all right nothing should be done for a while at least. It does no harm to leave a child attached to the cord for an hour or even two. As cutting the cord is a simple process it can be cut as soon as pulsation has stopped and before if the baby or mother needs attention.

It is natural for a newborn baby to breathe at once and then to cry lustily. If the air does not cause the child to breathe it should be held by the feet, head down, and lightly slapped on the back with the palm of the hand. If this does not suffice the baby's body can be placed in warm water and then plunged into cool water being then removed at once to the warm.

The use of alternating baths of warm and cold water is about as far as the friends can go without the doctor. Before starting efforts to make the baby breathe, the little finger, covered with a handkerchief, should be run into the baby's mouth and any mucus found should be cleaned out. Go as far back as possible into the throat.

Assuming that the baby has breathed satisfactorily, that the cord has been cut and the mother is resting quietly the baby is to be cleaned. To begin with the eyes are to be washed with soft sterile cloths or cotton dipped in a saturated solution of boric acid. The cloth used on one eye should not be put back into the solution. A fresh cloth is used for each eye. In addition the doctor upon arrival will drop one drop of a 1 per cent solution of nitrate of silver into each eye.

The head and then the body and limbs are to be thoroughly greased with olive oil, vaselin or lard to remove the cheeselike matter and then with soft cloths, warm water and soap to remove the grease. The head is to be washed and dried before the body is washed. Pat the skin dry with soft cloths. The navel is to be dressed with sterile gauze. Previous to the bath and for a short time thereafter it is advisable to note the cord occasionally to be sure that there is no hemorrhage.

As soon as the baby is dressed let mother and baby sleep for six or eight hours. Water can be given every three hours. The danger that too much will be done is fairly great; the danger that too little will be done is slight.

SUPPLIES FOR CHILDBIRTH

"If a woman is to be confined at home she should provide the following:

Two to four pounds of absorbent cotton.

One large package of sterile gauze (twenty-five yards).
Four rolls of cotton batting.
Two yards of stout muslin for abdominal binders.
Twelve old towels or diapers.
Two old sheets.
Two yards of bobbin, or very narrow tape, for tying the cord.

"Other things that may be needed are:

One hundred bichlorid of mercury tablets.
Four ounces of boric acid.
One bottle of white vaselin.
One pound of castile soap.
One quart of grain alcohol.
One douche pan.
One stiff hand brush.
One slop jar or covered enamel bucket.
Three pottery or agateware basins, one sixteen inches and two eleven inches in diameter.
At least three pitchers—holding one quart and upward.
One and one-half yards of rubber sheeting, at least thirty-six inches wide, or one and one-half yards of white table oilcloth to protect the mattress.
One two-quart fountain syringe.
One medicine glass.
One medicine dropper.
One drinking tube."

The above is quoted from "Prenatal Care." We can indorse all of it except possibly the advice to lay in 100 bichlorid of mercury tablets.

This list is followed by detailed instructions on how to make and sterilize pads, sponges, pledgets and bobbins.

"Prenatal Care" is a simple treatise on the care of the mother in pregnancy and during confinement and the care of the mother and child after confinement. Any woman can understand it. Every mother and every prospective mother should read it. The cost? Nothing.

It is issued by the Children's Bureau of the United States Department of Labor and is No. 1 of the Care of Children Series. If you want it write for it. If the supply gives out write your congressman asking him to work for a new supply. That's what congressmen, congresses and governments are in Washington for.

Books on Pregnancy.—*Mrs. C. G. writes: "Will you give me the name of some good books on pregnancy? What books can I read to which I can give a great deal of thought and at what period of pregnancy will it have the most effect to influence or rather stimulate the child's mind? I am very much subject to constipation. Bran bread, cooked and raw fruits and even purgatives have little or no effect. My only relief is an enema."*

Reply.—1. "Prenatal Care," published by Children's Bureau, Department of Labor; "The Prospective Mother," by Slemons.

2. It is evident that you have been told that a pregnant mother can influence the mentality of her developing child by reading books. You have

been misinformed. Good books will be good for you, but they will not affect your child.

3. Drink lots of water; try agar; try mineral oil.

No Age Limit.—*Mrs. E. T. writes: "Will you please state the age limit for a woman to bear her first child without endangering her own life? Does it make a difference if the mother is of slight build? Can a child be marked physically before birth?"*

Reply.—1. There is none, if she is skillfully cared for.

2. No.

3. No, so far as birthmarks and deformities are concerned.

Infection in Childbirth.—*N. M. T. writes: "I am writing to you to know if when the mother has had gonorrhea will it infect her offspring? If so, in what way? She is very anxious, but in fear of infection. Her doctor says she has been cured, but is left with leukorrhea, which is bad. Should she be this way?"*

Fig. 272.—Bed Rest and Table.

Reply.—If she is cured her offspring is in no danger. The leukorrhea may be due to gonococcal infection; it may be due to other causes. If it is due to gonococcal infection her child is in some danger of deformity due to infection before birth. Its eyes may be infected at the time of birth. If your inquiry relates to a child that has been born and no accident has taken place infection may still occur from contact. If she will be very cleanly in her habits the child is in very little danger.

Presumptive Symptoms.—*R. B. writes: "1. What are the first symptoms of pregnancy? 2. Is it possible for conception to occur ten days before the menstrual period? 3. Does pain in the right breast indicate that condition? 4. How soon do symptoms occur? 5. Is dancing dangerous during that time—that is, will it be apt to cause a miscarriage? 6. If menstruation occurs will it signify that the woman is not pregnant?"*

Reply.—1. (a) Cessation of menstruation; (b) changes in the breast; (c) morning sickness; (d) irritable bladder. Slemons calls these the presumptive signs.

2. Yes.

3. By itself it would not be a sign of much value.

4. Varies in different women. In some women some one or several of these signs appear in a few days. Usually the first indication is the cessation of menstruation. Diagnosis within the first two months, even by a physician, is a good deal of a guess. A laboratory test known as the Abderhalden test is now being tried out.

5. There may be a little danger within the first month. It is not great if the dancing be in moderation.

6. Yes, though there are exceptions.

Should Forget Worries.—*Reader writes: "Will you kindly advise if a pregnant woman, who is weak and nervous, can undertake a long travel to the South or West without injury?"*

Reply.—This is a matter to be decided as the result of personal observation. However, my guess is that you can. Traveling is comfortable and a pregnant woman can do about as other women. If you will forget your fears and worries probably the trip will not tax you greatly.

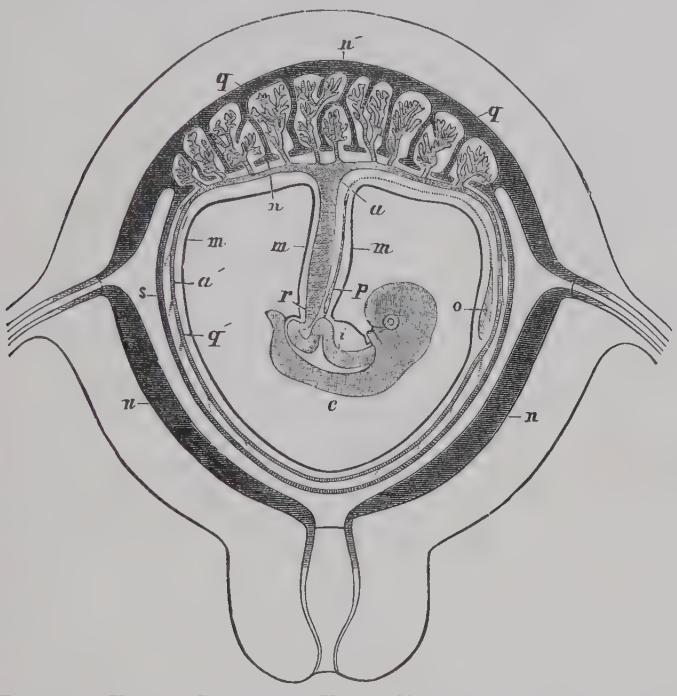


Fig. 273.—Pregnant Uterus Containing Young Embryo. *c*, embryo; *i*, alimentary canal of embryo; *r*, *p*, *m*, *m*, various structures composing umbilical cord; *q*, *n'*, *q*, *a*, placenta; *m*, *a'*, *q'*, *s*, membranes surrounding embryo; *n*, *n*, lining membrane of uterus.

"Marking" of Child.—*Mrs. A. D. writes: "Will you kindly settle a question which has long puzzled us as well as many others.*

"1. Is it possible to 'mark' a baby through mental impressions of an expectant mother?

"2. Is it true no nerves whatever connect mother and child, connection being entirely through the blood through the cord?

"3. Will mental impressions of mother mark or disfigure a babe during first two months of pregnancy?"

Reply.—1. No.

2. Yes.

3. No. After conception the mind of the mother cannot influence the child except indirectly. For instance, if she worries and in consequence is illy nourished the growing baby is less liable to thrive. That, however, is a matter of nutrition, not marking

The Nipples.—*Mrs. A. B. writes: "An expectant mother has as yet no pronounced nipples. What can be done to hasten development?"*

REPLY.—Wash the nipples daily with alcohol, then gently pull them for a few minutes. The nipples tend naturally to assume the right shape. A little help suffices.

No Harm to Child.—*M. L. writes: "Can you tell me what can be done to prevent an expectant mother (six months) from being despondent? She wakes in the morning perfectly well but despondent, and falls asleep at night in the same condition. Will it affect the child?"*

REPLY.—1. Keep the bowels open. Exercise in the open air. Read entertaining, optimistic books. Keep with bright, cheery people.

2. The condition described will not harm the child. There is nothing to worry about.

Amenorrhea.—*C. E. W. writes: "What is the meaning of 'amenorrhea'?"*

REPLY.—The accurate meaning is absence of menstruation.

The accepted meaning is scant menstruation.

No Bar to Marriage.—*Miss M. writes: "I had one of my ovaries removed some years ago. Is it possible for me to have children? If not, would you advise me to get married?"*

REPLY.—The removal of one ovary has no effect on one's ability to bear children. It is no bar to marriage.

Is No Proof.—*Mrs. J. M. writes: "Is the fact that menstruation takes place at all proof that the Fallopian tubes are not closed? Why? Would a nervous woman's chances of bearing children be greater if the external causes of nervousness were removed?"*

REPLY.—1. No.

2. Menstruation is from the uterus and the tubes lie beyond that organ.

3. Nervousness does not prevent a woman from bearing children. To relieve nervousness will not cause a barren woman to become child bearing.

Abderhalden Test Tells.—*Mrs. W. B. writes: "When a woman is pregnant does menstruation stop? Can a woman's abdomen increase in size daily unless she is pregnant? Is there any way to tell?"*

REPLY.—1. Yes. The exceptions are too few to be of any importance.

2. Yes. It may enlarge from tumor, from fat, or from increasing laxity of the wall muscles.

3. Yes, an Abderhalden test; also physical examination.

Hazard Is Decreased.—*Mrs. D. A. C. writes: "Here is the case of a woman whose first baby was born when the mother was within a few days of 36 years of age. Before the birth the attending physician said, though the prospective mother was in perfectly normal condition, it was impossible to predict a safe first confinement in a woman of her age. Is this uncertainty or danger considered to exist in case of the birth of a second child to a woman beyond 38 or 39 years of age?"*

REPLY.—There is some extra hazard with the first child. The extra hazard is somewhat less with the second.

Danger Not Great.—*A. B. writes: "Is it dangerous for a woman of 47 to give birth to a child for the first time in her life?"*

REPLY.—In a good hospital under good medical care the danger is not great. It would be less than the average danger of the average woman under average city conditions.

When the Stork Is Expected.—*G. F. writes: "How soon should a doctor be consulted regarding the arrival of the stork? Should the prospective mother be examined at regular intervals? Is there any benefit derived by rubbing to soften the abdomen? If so, would any pure oil do? Should the mother be given tonics to strengthen her?"*

REPLY.—1. About the fifth month if everything is going well; otherwise earlier. This visit should be for advice and counsel as to hygiene, sanitation, habits, what to read and what to do. It is of prime importance that mothers should know all about themselves and their expected babies.

2. In the average case, in the sense of physical examination, no. Such physical examination as the physician may need to determine that everything is physiologically correct should be made. Beyond that the visits to the physician should be educational.

3. Massage of the skin mildly done may add to the comfort. Any oil will do. It is scarcely worth while.

4. No. Food and rest from hard work but with mild exercise is the proper tonic.

Prospective Mother.—*H. L. J. writes: "Would any of the following be injurious during pregnancy: Scalp treatments, examination and treatment for catarrh, having teeth attended to?"*

REPLY.—No.

Reply to M. W.—Let nature take its course. A woman is in no better condition to bear a child two or five years after marriage than in ten months after. She may be in worse condition. I expect that you have also seen many babies born three years after marriage. All you need to know you can learn in ten months. Write to the Child Welfare Bureau at Washington, D. C., for its pamphlet on prenatal care; or buy Slemons' "Prospective Mother."

Reply to R. S.—Thirty is not too old to marry. It is generally agreed that children born of parents around thirty are better specimens than those born to parents under twenty. As to whether a nervous woman should marry, everything depends on what is meant by nervous. If she is now well her case is probably one of bad mental training. If so, it constitutes no bar to marriage.

Can't Determine Sex.—*J. H. J. writes: "A few days ago someone asked if the parents could determine the sex of their child. I wish to state that Fowler says in his 'Sexual Science' that where there is no love there will be no conception, and if there is love on one side and none on the other there may be conception and the child will take the sex of the parent whose love for the other is the stronger."*

REPLY.—Bosh! How did Fowler find that out?

Will Do No Harm.—*J. E. H. writes: "Is it harmful for a pregnant woman to wear maternity corsets?"*

REPLY.—No.

Follow Doctor's Plans.—*A. C. E. writes: "Eight years ago I had an operation for extra-uterine pregnancy, followed by infection, and have since had a stiffening and cracking in the joints that began in the ankles. It has reached the shoulders, elbows, and knuckles, and at times is exceedingly painful. For the last couple of months I have noticed a soreness in the cords of the back and sides of the neck. 1. Has the joint trouble anything to do with the neck? Is it a form of rheumatism? 2. Would any kind of diet help conditions? Do red meats aggravate? I also have a ringing in one ear, much like the effect of quinin. 3. Is this caused from the same trouble and is there any positive cure? I am 45 years old."*

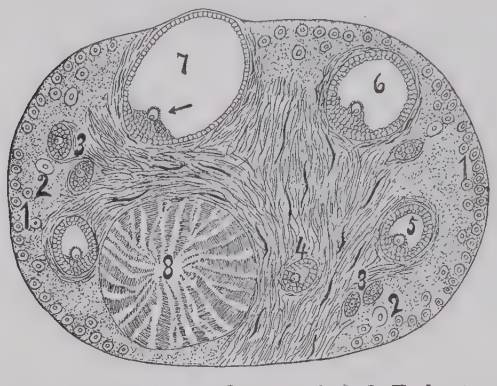


FIG. 274.—SECTION OF OVARY. 1, 2, 3, Early stage graafian follicles; 4, 5, 6, graafian follicles approaching maturity—ovum can be seen; 7, mature graafian follicle—arrow points to ovum; 8, corpus luteum.

REPLY.—1. I judge that you have a rheumatoid arthritis. The neck and joint trouble are parts of the same disorder. In all probability the infection causing your joint trouble enters through your throat or nose and is related to the cause of the ear trouble.

2. A good nutritious diet proportioned to the exercise you take will do you good.

3. No. Your trouble probably has not much relation if any to your operation. Have your nose, throat and teeth put in order. Cure is improbable, but by following a plan laid down by some sensible physician you can keep in good condition.

No Legal or Moral Right.—*J. M. K. writes: "1. When a woman becomes aware that another child is coming has she the moral right to determine whether that child shall be given the right to exist or not? 2. If it would be a horrible crime to deprive a child of life the day after it was born, would it be any less a crime the day before? 3. Or the month before? 4. Or at the first moment that the mother becomes aware of the existence of another life? As I understand it, eugenics and the modern sophists generally would have us believe that we know a great deal more than the God who made the laws of nature, and may complacently transgress them as we see fit."*

REPLY.—1. No, neither the legal nor the moral right.

2. No.

3. No.

4. No.

J. M. K. fails to understand eugenics. Control goes farther back than the questions in his letter indicate that he has in mind. I should think it impossible to find Scriptural warrant for the crime, injustice, immorality, disease, want and death to which improper mating and riot of passion foredoom some of God's creatures.

No Need to Fear for Child.—*S. S. writes: "If a woman, marrying for*

the first time at the age of 43, should bear a child, would it be below normal mentally or physically, provided all conditions, except the age of the mother, were of the best?"

REPLY.—No, decidedly. Averaging 5,000 children born to women 43 years of age with 5,000 born to women 25 years of age the first group would not equal the second but if those of the first group had a good inheritance, they would be far above average children. Advanced age of the mother is a factor but it is insignificant as compared with venereal disease, alcoholism, neurasthenia, hysteria or a score of other ills which might be mentioned.

Childbirth is more difficult and more hazardous for a woman of forty-three than for one of twenty-five; that is, averaging, say 5,000, and this is found to be true. But women in childbirth at forty-three now are safer than women at any age were twenty-five years ago.

Such a woman with good obstetrical care is much safer than is the woman of any age who is cared for by a midwife.

Need Not Worry.—*Mrs. C. A. H. writes: "I have been pregnant for three months, and had the misfortune to fall, not injuring myself or even having pains. I was of course sore for a few days on the side on which I fell. A neighbor has told me she lost a baby just by slipping at this time."*

REPLY.—Nothing for you to worry about. You ought to feel sorry for your neighbor but that is far enough to go.

Marrying at 48.—*R. writes: "Would it be possible for a woman marrying for the first time at the age of 48 to become a mother?"*

REPLY.—Possible but not probable.

Medicine No Help.—*Mrs. O. T. B. writes: "1. What is the cause of infantile uterus? 2. Will medicine of any kind help it? 3. Is it the cause of scant menstruation and continuous back- and headache?"*

REPLY.—1. The cause is failure to undergo full development.
2. No. Pregnancy is about the only effective cure.
3. It is one cause.

Fibroid Tumors Not Cancer.—*Mrs. M. R. writes: "Will you tell me the nature of a fibroid tumor; also what causes it? When my baby came I had quite a large lump at my abdomen. It did not cause me any pain, only since I know it was a tumor it worries me. Most persons say tumors are cancers."*

REPLY.—A fibroid tumor is a tumor composed of fibrous tissue. Fibroid tumors are not cancers. They are benign. Occasionally, though rarely, they become malignant cancers. Since fibrous tissue is to be found everywhere in the body fibroid tumors are found everywhere. Yours is developing from some pelvic organ. Sometimes fibroid tumors can be cured by radium, sometimes by X-rays applied in a special way. Usually operation is required. Get good surgical advice and follow it. Nothing is gained by worry.

Treatment for Fibroid.—*Parent writes: "1. Is a fibroid on the womb dangerous in a woman of 26? Does it grow, and is an operation advisable?*

Is there any cure other than an operation, and, if not, is the operation absolutely sure to cure? 2. What is the best method of handling a fistula in a child of 2 years?"

REPLY.—1. Not necessarily. As it grows it may endanger life. Fibroids are liable to become infected, to strangulate or to produce hemorrhage. They are very liable to accidents. Operation while the fibroid is small is generally advisable. Some cures have been made by X-rays and by radium.

2. While a fistula may heal spontaneously it is not good judgment to leave the condition to home treatment. You should take counsel.

Operate for Fibroid Tumor.—*E. M. G. writes: "Your article on uterine fibroid tumors was of great interest to me, as I am afflicted with a five-pound tumor. The surgeon who examined me said my tumor was a dense mass. Do you think it would be possible for my dense tumor to be removed by radium or X-ray treatments? I am 41 years old."*

REPLY.—Possibly, though operation would be surer.

Radium and Fibroids.—*L. K. writes: "Some time ago I saw an article in which Dr. Howard Kelly of Johns Hopkins University was quoted as saying that '90 per cent of all fibroid tumors can be cured or relieved by radium.' Has that result been found by the Chicago practitioners also?"*

REPLY.—Radium is still on trial. I doubt if it has enough penetrating power to reach a fibroid. The experience of Chicago practitioners with radium has been limited.

Operation Will Relieve.—*S. K. writes: "A friend has been troubled with falling womb for about ten years. Because she believed her condition incurable and did not want to distress anyone, she foolishly told no one about it, until it has become so aggravated that the womb is now wholly exposed. Can anything be done now? Would an operation be possible or advisable? If so, what would be the danger and the expense? The woman is sixty-seven years old and otherwise strong, though she has attacks of weakness with abdominal pains quite frequently."*

REPLY.—The condition is not so infrequent as you think. It can be relieved by operation.

Operations No Barrier.—*Anna B. writes: "I am a girl of 18. I have had operations for growths. 1. Do you think it possible that I could have had a fibroid tumor? 2. Shall I have change of life earlier due to the operations, and at about what age? 3. Will I be prevented from bearing a child? 4. Would my marrying early prolong change of life?"*

REPLY.—1. Fibroid is possible but not probable.

2. No. The age for change of life varies. You probably will have it about the same age your mother did.

3 and 4. No.

Should Go to Hospital.—*Mrs. S. G. R. writes: "I am 34 years old; have one child, and expect to have another within three months. My husband thinks I do not get enough exercise. Will you answer the following questions: 1. Is two hours' brisk work every morning, making beds, dusting, putting to rights five rooms, enough exercise, or should I also take long walks? 2. Would the possible complications on account of my age make hospital preferable to the best of home treatment during con-*

finement? 3. Please recommend some book that will be beneficial, some work on the care and feeding of a baby. 4. Please tell me if there is any virtue in the medicine called 'Mother's Friend,' which is to be applied externally?"

REPLY.—1. Go for a short, easy walk each day. You are taking enough exercise considering the stage of your pregnancy but you need some air.

2. Yes, it is always to be preferred.

3. There is nothing better than Slemons' "The Prospective Mother." Send to the Children's Bureau, Department of Labor, Washington, D. C., for the pamphlet "Prenatal Care." For the care of the baby get Holt and Kilmer.

4. None.

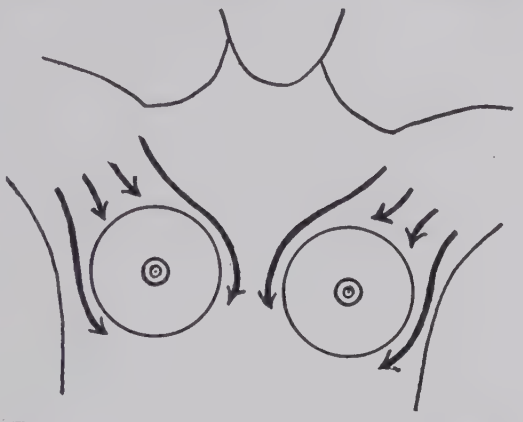


FIG. 275.—MASSAGE OF THE BREASTS, TO INCREASE THEIR SIZE. (Herb.)

No Danger to Offspring.—*H. A. E. writes: "1. If a man of 60, in good health, should marry a spinster of 31, also in good health, would any of the possible offspring be likely to suffer mentally or physically owing to the age of the father or the discrepancy in ages between husband and wife? 2. In other words, has a baby boy with a father aged 60 as good an equipment for life's battles as though the father were only 30? 3. How much is the danger of childbirth increased by the mother waiting until she is 31 years of age before marrying?"*

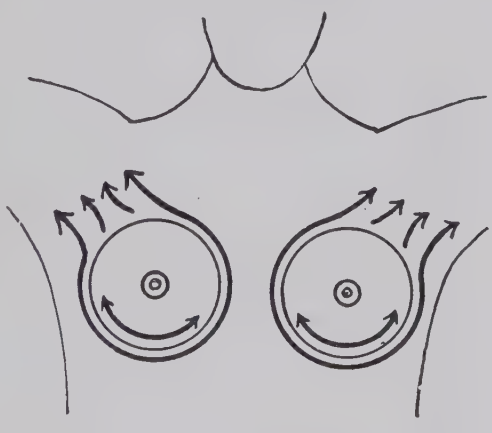


FIG. 276.—MASSAGE OF THE BREASTS, TO DECREASE THEIR SIZE. (Herb.)

REPLY.—1. No.

2. Yes.

3. Say 10 per cent.

Artificial Change of Life.—*Mrs. J. F. writes: "Kindly tell me the cause of hot flashes, nervousness, overanxiousness, physical weakness, stupidity, laziness, and everything that tends to make up a human wreck. I had an operation some years past. The sexual tubes were removed. I had no trouble with the operation, which was quite a success, but since I have been on the verge of prostration and have had quite a lot of financial troubles*

which worry me. I am as irritable as can be. I have palpitation of the heart terribly. I awake quite suddenly from really no cause. I have nervous indigestion. Is my case hopeless?"

REPLY.—My guess is that you are suffering from lack of ovarian secretion. Possibly you would be helped by the use of preparations of ovary.

However, you will be helped more by cultivating poise. Your trouble is self-limited. It does not threaten your life. Therefore be cheerful. That will help you more than spoon medicine.

Try Eating More.—*W. A. M. writes: "Kindly let me know what you would advise in my case. I am 25 years of age and have had three children. The youngest is 11 months old. I have suffered with a sort of neuralgia ever since the birth of my second child. I had all my lower teeth extracted two months ago. It is not an acute neuralgia, but a nag, nag, nag. I generally weigh 90-odd pounds, but have only weighed 78 this summer."*

REPLY.—You need to feed up. Caring for three children, the youngest less than a year old, is hard work and you need to eat enough milk, bread, meat, vegetables, and fruit for the day's work and a little besides.

If lessening your work and increasing your flesh does not stop your facial neuralgia see your physician.

Evidently you are disposed to neglect yourself. That you had to have all your teeth pulled proved that. People who take care of themselves do not have to go through that ordeal.

Not Too Late.—*Mrs. C. M. L. writes: "I am thirty-six years old and have had thirteen children. The last one came four years ago. The baby was presented wrong and was born so, causing great suffering. I was lacerated and the doctor in attendance did nothing for me at that time. Is it too late now to have the work done? I know I would be better off could it be remedied. Otherwise I enjoy good health."*

REPLY.—No. It is not too late.

Affliction Not Dangerous.—*L. M. K. writes: "1. Will you kindly let me know if a young woman of 28, unmarried, could have ulcers of the uterus? 2. Are they dangerous? 3. What is the best treatment?"*

REPLY.—1. Yes.
2. No.
3. Local treatment.

Pregnancy Test.—*A. L. R. writes: "Kindly tell me if there is a positive test to determine pregnancy at three months. If so, where is it obtainable?"*

REPLY.—A physician can make the diagnosis. It can be diagnosed by a laboratory test.

Difference Not Great.—*Mrs. H. R. writes: "Will you please tell me what the danger is, if any, to a woman of 38 becoming pregnant for the first time, having been married nine years?"*

REPLY.—The danger of accident during labor is somewhat greater than with a younger woman. However, the difference is not great.

Leukorrhea.—*W. B. writes: "What is the cause of leukorrhea?"*

Reply.—Leukorrhea is the result of infection of the lining of the uterus or Fallopian tubes or both. The infection may be with any one of several organisms.

Need Not Fear.—*Mrs. R. T. H. writes: "Will you kindly tell me if there is any danger for a woman of 43 to give birth to a child for the first time in her life?"*

Reply.—Labor probably will be a little more trying than with a younger woman. Cared for by a good physician, preferably in a good hospital, she need have no fears.

Regularity Should Rule.—*G. T. writes: "After a woman is curetted, having had a three months' miscarriage, how soon should she menstruate afterwards, and will she be regular?"*

Reply.—The next month. There is no reason why she should be irregular.

Consult Your Physician.—*M. A. L. writes: "Is it of any importance to a woman who is pregnant to show signs of flowing? I flowed slightly at four months and the same at six months. I am 40 years old."*

Reply.—It is of importance. Frequently it occurs without meaning any injury to the child. My advice to you is to be very quiet when bleeding. Have your physician see you each month from now on.

Operation Not Necessary.—*D. A. writes: "A young married woman, aged 25, is anxious to become pregnant. For several years she has had a small hernia. During one winter only, when engaged in work that required much walking, it was large and painful. For the last year it has given no trouble whatever, but a slight swelling remains. Is an operation necessary before pregnancy?"*

Reply.—I judge not. It should not trouble you much more during your pregnancy than now. During labor, it should not be difficult to keep the hernia "up." Pregnancy will increase the inconvenience from the hernia somewhat but not much.

Doctor's Guess Better.—*M. R. S. writes: "Will you kindly tell me the first symptoms of pregnancy? How soon after conception can it be detected by such symptoms?"*

Reply.—Amenorrhea and nausea are early signs present in most cases. Women who have had children can usually sense the condition by illy defined changes in their feelings. Those trying to conclude from signs and symptoms will be wrong about as often as they will be right. Doctors guess at the condition before the second month.

Nevertheless, a doctor's guess will be much better than yours and you had better proceed in that way. A highly promising new test is known as the Abderhalden serum test. It can be made only by a laboratory.

Can Regain Ground.—*B. M. F. writes: "1. Does the return of menstruation six weeks after the birth of a first child (the mother nursing the child) indicate that the mother has overexerted herself after confinement? 2. If menstruation recurs after another month, should she take anything to check it, providing the child appears to be unaffected by it? 3. If mother*

and child both appear to be in normal, healthy condition during these periods, is there any reason for deploring the fact that menstruation has returned? Slemons says: 'Many operations in later years are dependent upon imprudent exertion soon after the birth of the first child.' 4. What would such operations be for? 5. If a mother has reason to suspect that she has worked too hard during and after the fourth week after confinement, can she, by proper care, regain the lost ground, or must she permanently suffer the consequences?"

REPLY.—1, 2, and 3. No.

4. Subinvolution for one; that is, the uterus does not decrease to the normal size. Displacements for another. Incompletely cured infections for another.

5. In most instances she can.

Will Have No Effect.—*M. E. S. writes: "I am a woman, 25 years of age, the mother of two children. I am now pregnant seven months and have had a slight menstruation every month. Otherwise the balance of the time I am well and strong. Kindly advise me what effect this will have on the coming child and also on myself."*

REPLY.—It will have no effect on either of you. This opinion is based upon the statement that the hemorrhage is slight, and that it has come once a month for a few days and then has stopped.

May Last Four Months.—*Mrs. W. McG. writes: "What can be done to relieve the sick stomach of pregnancy? I do not vomit, but am weak, dizzy, and seasick nearly all day. Over how much of the period does this condition generally last? How early in pregnancy should one see a physician?"*

REPLY.—1. Eat a little food, say two crackers and a peach, before getting out of bed. Dress leisurely, resting occasionally. Eat a light breakfast; keep the bowels free; exercise in the open air. Eat what you have an appetite for; do not eat what you dislike. Chew well; eat slowly. If you vomit you will probably be hungry soon after. If so, eat.

2. It sometimes stops in one month, frequently in two months, generally in four months.

3. If the nausea is troublesome have a physician at least once in that period. He should examine the urine especially. Have the physician from time to time after the fifth month according to how things are going. Why not get Slemons' "The Prospective Mother"?

Two Books Suggested.—*Mrs. L. B. writes: "Please refer me to a good work on the subject of what a woman should know before and after giving birth to a child."*

REPLY.—"Woman and Marriage," Stevens; "Chavasse's Advice to a Wife," Barnes.

Read Slemons' Work.—*Mrs. H. writes: "Kindly advise some good book for an expectant mother to read."*

REPLY.—Read "The Prospective Mother," by Slemons.

Be Examined by Physician.—*J. B. K. writes: "Since the birth of my child, about seven years ago, I have been troubled with swelling of the legs, with considerable ache and pain accompanying. Sometimes the*

swelling leaves almost entirely; then again it shows in the face. What is the probable cause and can it be cured?"

REPLY.—Have an examination to discover the reason for this abnormality. Probably you have Bright's disease.

Morning Sickness.—*R. W. writes: "1. Does 'morning sickness' appear as early as fifteen to twenty-one days from beginning of pregnancy? 2. Can you recommend a good book for a young prospective mother which will guide her in preparation for the coming child?"*

REPLY.—1. Yes, not infrequently.
2. "The Prospective Mother," by Slemons, published by D. Appleton.

Cause of "Blue" Baby.—*C. R. writes that recently his wife gave birth to a "blue" baby. It died when a few hours old. What causes babies to be blue? Is the next baby liable to be blue? Both the mother and father are healthy.*

REPLY.—The condition known as "blue" baby is due to blood passing through an opening from the veins at the heart into the arteries near by. In consequence, the dark blood of the veins does not pass through the lungs and is not changed into red blood.

This opening is natural and is of service before the baby is born. It should close in order that the lungs after birth can properly do their work. It sometimes remains open. From certain deformities of the heart of this kind "blue" babies result.

The cell starting out to build up a child in nine months has many complicated things to do. Sometimes it slips a cog, and some deformity results.

Considering the wonderful complexity of the things which it does the wonder is that it does not slip a cog more frequently.

We stand by a Hoe press and are amazed at how each thing nicks in at just the right time and place. A Hoe press is as simple as A B C compared with the development of an unborn baby.

Heart deformities are not due to disease of, injury to, or mental condition of the mother. The machinery just failed to click right.

There is no reason to fear the same trouble in the next baby.

Should Not Overeat.—*L. B. E. writes: "What is the proper food to eat, and what the correct exercise for a woman aged 39, whom the stork will visit for the first time in three or four months?"*

REPLY.—Whatever is good personal hygiene for a woman under ordinary circumstances is good personal hygiene for her in pregnancy. The idea that a pregnant woman should eat for two is wrong. If she tries it she will get indigestion or both she and her baby will get too fat. An authority has said:

"Prospective mothers neither want nor need to eat for two. The fact is more likely that enough for one is too much for two."

Ordinarily too much food is eaten. This excess is ample to take care of the needs of the developing child. The little excess of starches and sugars needed in the last months will come from this excess. If a woman craves any special food let her have it. But be certain that she does not overeat.

As to exercise, if the woman has been doing physical labor or factory work she should take it more easily during the last two weeks. Women who do not work out should get some out of door exercise. Nothing is better

than the customary walk. Slemons says the daily walk should be more than two and less than six miles.

No Need to Fear.—*M. J. K. writes: "Could a woman 48 years old become pregnant after years of married life? She has never had children. I have had hot flashes every fifteen minutes all summer and at present I think I shall lose my mind. I am nervous and think all manner of things are going to happen. Doctors have told me I have adhesions and that the womb is tipped backward. I eat well, but sleep at times fitfully on account of the hot flashes. What shall I do?"*

Reply.—A woman of forty-eight can become pregnant, but the chance is exceedingly slight. Evidently you are neurasthenic. The hot flashes mean change of life. You are not losing your mind; you need not fear that. Cease thinking about it, or harm from adhesions, or anything else that is dire.

Pregnancy.—*R. S. writes: "A woman at the beginning of the eighth month of pregnancy develops severe dropsical conditions, convulsions set in and the child has to be taken. If she ever becomes pregnant again, are these conditions liable to occur if she is constantly watched by a competent physician?"*

Reply.—It is possible but not probable.

Milk Leg.—*G. S. writes: "1. What are the causes of milk leg? 2. What is the duration of milk leg? 3. What is the average result? 4. What is the most common treatment? I have had it three months. The pain has left, but the swelling remains about the same. 5. Do you think it is improving?"*

Reply.—1. Inflammation of the main vein of the leg. Usually there is a clot in this vein. Infection with mild germs is one cause. Extension of a clot from the uterine veins is a cause.

2. Usually a few weeks; varies, however.

3. Recovery.

4. Keep the leg warm and comfortable.

5. Keep your limb warm. Massage it carefully every day. Your acute condition has passed. The plugged blood vessel is permanently plugged. In time your other leg veins will get large enough to make up for the one now plugged. Exercise should help that on.

CHAPTER XLIV

The Baby

HELPING BABY LIVE

The baby's hardest day is his first day. His hardest week is his first week. His hardest month is his first month. The men who study figures tell us that never again will baby have as many hazards as during the first month of life.

Whether or not the baby is to live to be a month old depends upon inheritance and its experience in "gittin' borned." After it passes one month and until it passes two years, whether or not it is going to live depends upon the care it gets.

After two years of age it has a pretty good grip on life and can live in spite of a good deal of neglect.

This article deals with the period when care is of most importance—from one month to two years of age.

Lately the Chicago health department published a table showing that the business of being a baby was an extremely hazardous occupation.

In certain parts of the city being a baby is not so hard a job. For instance in a part of the city where good, homey conditions prevail, out of each 1,000 children under 2 years old only ten died from diarrhea in a year.

On the northwest side, just north of the railway tracks, about 66 died out of each 1,000. Being a baby in that neighborhood is a harder job than being a baby in Russia—and that is supposed to be about the last word.

This city bulletin tells us that a baby in certain parts of town has a 4 to 1 chance to live; that a baby on the boulevards has a 100 to 1 chance. Why the difference?

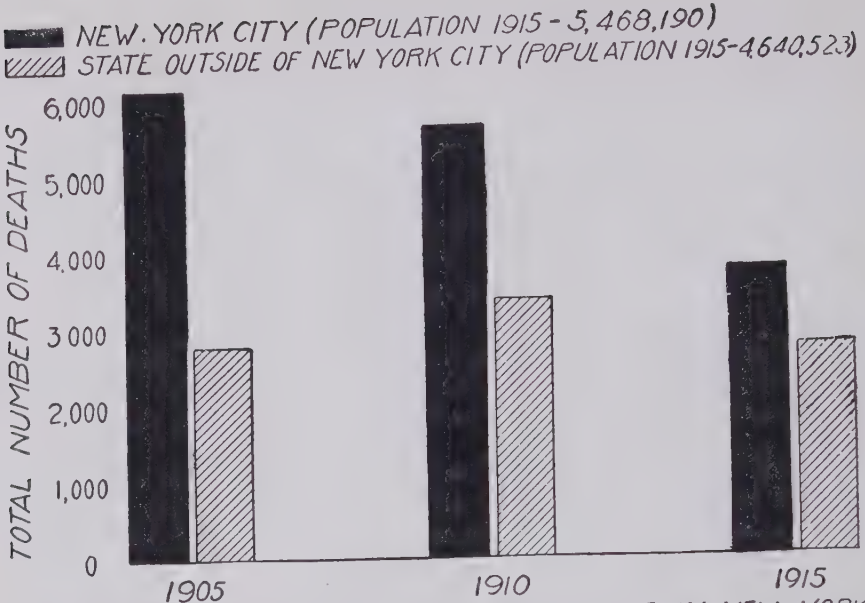
The people in the one district can afford to and do secure for their babies such care as saves their lives.

The people of the other district do not, and usually cannot, secure for their babies the care necessary to reduce the chances from 4 to 1 to 100 to 1.

Now, what are the main elements in the needed care? The most important is that the milk be just right. Almost right, nearly right, will not do. What is needed is cranky care—the kind of care that will not have it unless it be just right.

The bottles and nipples must be clean. Nearly clean, almost clean, clean enough will not do. A certain way to clean must be followed in minute detail, and doing it nearly the advised way will not lift the chances from the 4 group to the 100 group. When it comes to other details, more leeway is allowable.

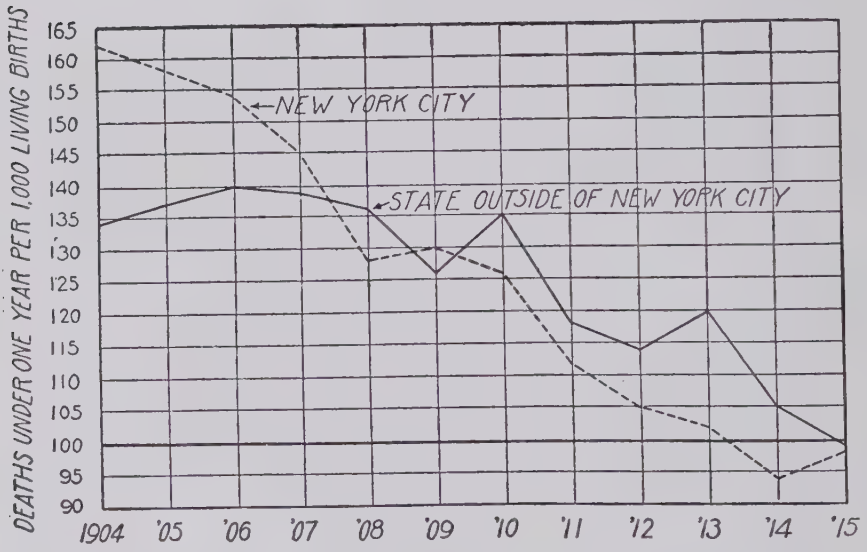
Perhaps the next most important element of care is to see that diarrheas are not neglected. If the bowels become loose, or green, or bloody, or mucous, see that proper measures are taken to correct the underlying cause.



DIARRHOEAL DEATHS UNDER TWO YEARS OF AGE IN NEW YORK CITY AND IN THE STATE OUTSIDE OF NEW YORK CITY

New York State Dept. of Health.

FIG. 277.



INFANT DEATH RATE IN NEW YORK CITY AND IN THE STATE OUTSIDE OF NEW YORK CITY 1904-1915

New York State Dept. of Health.

FIG. 278.—COMPARISON OF THE HEALTH OF CITY AND COUNTRY BABIES.

It may be boiling the milk, or changing the food, or calling the doctor, or going to the baby tent; whatever the need, see that it is promptly attended to.

Other elements of care are that the baby be dressed in a cool fashion and kept in a cool place; that flies be kept away; that the baby be kept clean, be given water, be kept free from nervous strain.

SAVING NEW LIVES

We judge of the baby welfare by the baby death rate. Nobody collects any health data about babies except the health department. It gets a full record of deaths. Its record of baby sickness is incomplete. Therefore all that we have to judge by is the baby death rate.

In the first place, there is the total number of deaths—the deaths from diarrheal diseases, the deaths in the first month of life, and the deaths during July, August, and September.

The total number of deaths, when we compare the records of the different years, gives us some information as to whether we are taking better care of babies than in former times. This group of figures tells us that things are getting better.

The deaths during the first month of life are the result of birth accidents, bad maternity service, and neglect of the mother during the last months of pregnancy. This rate is not improving.

The death rate during the first month of life has not fallen during the last ten years. The conclusion is that more pregnant women are having to work, that midwife and medical service is going back a little, and that the number of birth injuries and accidents, congenital deformities, and abnormalities is slightly on the increase.

The increasing complexities of society make the wagon roll downhill unless definite, proper action is taken to scotch it. *The pivotal point in the baby situation is the hot weather care. Therefore the July, August, and September death rate is that by which the community's efforts to save the babies are to be gauged.*

The New York milk committee report shows that most of the annual saving in babies in the last few years has been in these months. For instance, in 1911 the number of babies dying in the three hot months was only 30 per cent of the total for the year. Ten years ago it was well over 40. The actual number of babies dying in the hot months was 1,700 less than eleven years before, in spite of the increase in the size of the city.

Philadelphia, Chicago, Boston, and Buffalo made the same kind of showing, although none except Buffalo did so well as New York City.

This continued talking about clean, cold, fresh, pasteurized milk, about keeping the baby cool, and all this warning not to push the baby's growth in weight during the hot months are bearing fruit.

Under the new plan the baby is within 10 per cent of being as safe in the hot months as in the cool.

NURSING THE BABY

A baby should always be nursed by its mother, unless the mother has tuberculosis or some other grave disease. The mother saves herself trouble by

nursing her baby. When she figures up the saving from diminished illness and adds to it the trouble of fixing the baby's bottle during the night as well as the day, she finds that she nets a gain by nursing her baby.

During the first two days the baby should be nursed four times a day and once at night. From three days to six weeks the baby should be nursed every two hours during the day and twice at night; from six weeks to six months every three hours and once at night; from six months to a year, six times between 6 o'clock a.m. and 10 o'clock p.m., and not at all during the night.

In addition to milk, babies require water from the very first. The old granny who gave the baby teas was a pretty good scientist, though she did not know it. Of course, the herbs which she used to make the tea had no particular effect, but she was giving the baby sterilized, warmed water, and that was as it should be.

After about the second month the baby should have some orange juice every day. The juice should be given freed from pulp. The amount should begin with two teaspoonfuls a day and should be gradually increased to four tablespoonfuls, especially where there is a tendency to constipation. *It is much better to relieve constipation with orange juice than by enemas, and certainly than by medicine, since babies need a little fruit juice to correct any tendency to scurvy and rickets.*

That the mother may give enough milk to supply the baby, it is necessary that she be free from worry and not called upon to do a great amount of physical labor. Emotion has more effect on the secretion of milk than does the food taken. Occasionally a woman will overeat until she becomes obese trying to give milk enough for her baby, and then worry so, fearing her milk will fail, that she gains nothing for her trouble.

There are no special foods which make milk. Beer does not; neither does milk. Some women have the idea that milk taken as a food runs without much change into milk for the baby. This is not correct. A mother should eat good, nutritious, simple, staple food containing a good deal of fluid.

That which she eats does not go directly to milk. It is digested and changed chemically thereby. It is absorbed and still further changed. Eventually it is changed into milk. She should increase the quantity of food eaten, since for her own use she needs more than she usually does, and in addition she is eating for the baby.

The average woman nursing one baby can supply the child with food out of her surplus if she will keep her mind calm, her rest unbroken, and not have too much work to do. The average woman who thinks she cannot nurse her baby can do so if she will try.

NEW ZEALAND BABY RULES

In 1914 New York City had a death rate of 9.46 per cent among its babies less than a year old. No other American city has ever had a rate anywhere near so low.

The New York state board of health reports that the death rate among

farmers' babies in rural New York is higher than the New York City rate.

Probably the figures for New York State are not very accurate. At that, they are about the most accurate we have. The chances are that the rate for rural New York is about the same as that for rural Illinois.

When we turn to Australia we find that they have found a way to reduce the sickness rate among farmers' babies. The New Zealand rate for 1910 was 5.1. The 1913 rate in Dunedin was 3.8.

FIG. 279.—SHAPE OF A BABY'S JAW.

New Zealand comprises two thinly populated islands. The largest city, Auckland, has 110,000 inhabitants. There are three cities with between 50,000 and 100,000 and three with between 10,000 and 20,000. In the main the people of New Zealand are country people.

There are several reasons for the healthfulness of babies in New Zealand. The laws are good. One gives $10 to each prospective mother, that she may have a little more rest and a little better food. A powerful factor is the Society for the Health of Women and Children. Through this society the newspapers carry a great many helpful articles on mothercraft.

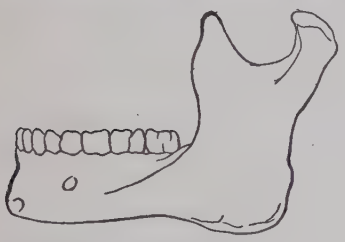


FIG. 280.—SHAPE OF AN ADULT'S JAW.

This society maintains hospitals, dispensaries, and a corps of nurses—one for every sixteen people. They publish a series of small handbooks in popular form. Among these are "The Baby's First Month" and "Feeding and Care of Baby."

They stand for a policy in baby care. Among the details in this policy are the following:

1. *The widespread adoption of clocklike regularity in the feeding of babies.*

2. *The extension of the intervals between feedings throughout the early months to three hours instead of feeding every two hours.*

3. *The entire abandonment of night feeding—that is, between 10 p.m. and 6 a.m.*

4. *The early use of hard, dry, or tough foods needing mastication.*

Dr. Arthur Newsholme indorses the opinion that babies after the first month do better if fed every four hours and not at all during the mother's sleeping period at night. This society finds that under this policy the babies thrive better. An indirect good effect is that it increases the proportion of mothers who breast-feed.

Another of their policies is to promote the use of pure, cold, fresh, out of doors air.

WHAT WOULD YOU DO?

Suppose you had a baby less than a year old; you are without breast milk; you have no icebox. What would you do? Forty-five per cent of homes are not supplied with ice. Fortunately a large percentage of the babies are borne by women who are able to nurse them. Not 45 per cent of the mothers are confronted by the problem of feeding a baby artificially when ice for keeping food is not available.

Another group of dry-breasted mothers lives in the country. They solve the question by keeping a cow in the barn and milking her whenever baby-feeding time comes around. More of them get fresh milk twice a day, which is not so good by far.

After all these eliminations there remain thousands of dry-breasted mothers who can neither have fresh milk nor ice. Put yourself in place of one of these. What would you do? You would make an effort to get ice. But suppose you failed, what would you do then?

You might get a high grade clean milk to start with and then keep it wrapped with a cloth wet with tap water. Evaporation would hold the temperature several degrees below room temperature. But suppose the room temperature was 94° from 8 in the morning until midnight. Milk does not keep unless its temperature is held below 55°. A wet cloth wrapped around the bottle will not keep the temperature so low.

The answer is that you would feed your baby on condensed milk, milk powder, or some form of baby food. The statisticians tell us that the heaviest mortality is among babies fed this way. The baby doctors tell us that babies should have "liquid milk," mother's milk, or, that failing, cow's milk. They are right, of course, but being without ice is a condition, not a theory, to borrow the phrase made popular by Cleveland.

If there is no ice, cow's milk for the city baby is ruled out. This is true whether it is certified milk, pasteurized milk, or plain milk. Put yourself in that position. Would you forget all about the better foods, now out of reach, and try to form a decision between what was left?

As you could not have good cold milk to mix with the food, you would select one that required no milk. You would select one that did not contain too much sugar, but above all, you would select one that kept well. You would get the best advice you could on these points, but you would insist that your adviser stick to the points asked and not run off at a tangent and advise you to use what you could not get.

FEEDING AND GROWTH OF BABIES

A baby should weigh seven and a half pounds at birth. It should lose from four to eight ounces the first week of its life and gain every week thereafter during the first year. During the first six months it should gain from four to eight ounces a week and during the second six months two to four. At three months it should weigh twelve to thirteen pounds; at five months, double its weight at birth; at six months, fifteen to sixteen pounds; at nine months, seventeen to eighteen pounds, and at twelve months, three times its weight at birth. The baby should be weighed every week until it is 1 year old and every two weeks when between 2 and 3 years old.

The mother who prides herself on the weight of her baby and its weekly gain is pursuing the right policy in the winter. In the summer she should go slow. In hot weather fat babies are in special danger and feeding to increase weight is risky.

If a mother cannot nurse her baby she is in an unfortunate position. It makes work for her and endangers the life and health of her baby. Of the

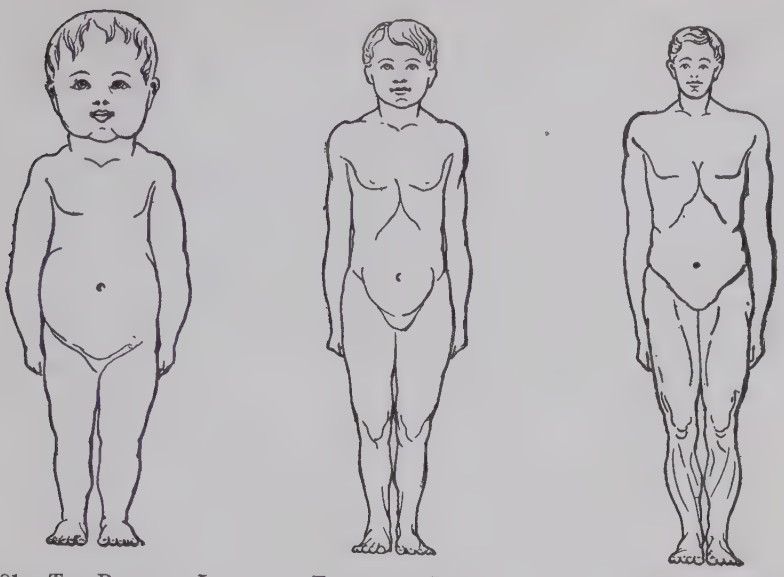


FIG. 281.—THE RELATIVE LENGTH OF TRUNK AND LEGS IN A BABY, A YOUTH AND AN ADULT.

artificial foods, cow's milk, properly diluted, is the best provided it is clean, young, and has been kept cold. As between dirty, old, and warm milk and the baby foods, the latter are better. *The best of all cow's milk is that which comes from a healthy cow free from tuberculosis and kept in a clean barn on the premises where the baby is. Such milk can be and should be consumed before it is twelve hours old.* Next comes certified milk; next properly pasteurized milk. No city or town should allow its babies to drink the ordinary raw market milk or market milk which is claimed to be pasteurized and is not.

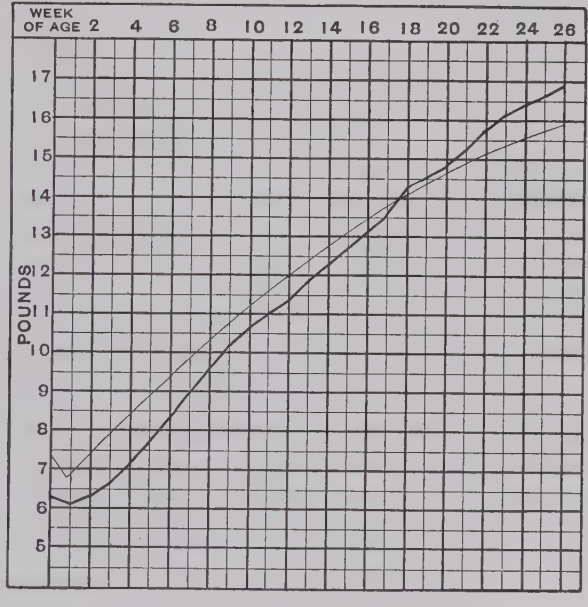


FIG. 282.—RATE OF GROWTH OF BABIES.

No mother should feed any milk to her baby that she has not investigated. She should see how clean, young, and cold the milk is; how clean are the bottles; how clean is the milk depot, the farm, and the milkers. If the milk is sold as pasteurized, is it? Some of this information is available at the health depart-

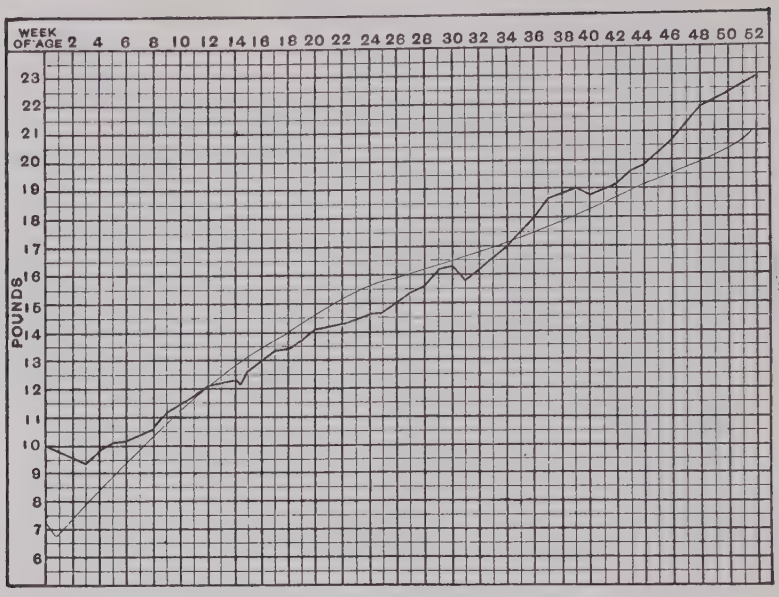


Fig. 283.—Rate of Growth of Children.

ment. No mother should feed milk to her baby unless she has got all the information which the health department has and as much additional as is within her reach.

FRESH AIR FOR THE BABY

Small babies are not "catchers." It is rarely that they have smallpox, diphtheria, and scarlet fever. Part of this good fortune is theirs because mothers are usually wise enough to keep small babies away from such diseases. They are not taken into crowds or on street cars, and they cannot run out on the street or mix with half cured children in schools. But these saving graces do not serve to protect them against measles and whooping cough—the two great causes of contagious illness in babies.

Babies do not catch cold easily and this is luckiest of all. The habit of catching cold is acquired by wrong living. Babies have not had time to acquire the habit. As a general rule, they are not coddled so much as grown people; they are seldom brought in contact with cases of "cold," and they have not had occasion to become chronic carriers of the germs of colds.

If the baby is kept in a clean, well ventilated nursery, his chance of keeping free of cold will increase. The following rules should be followed:

The nursery should be kept at 68°. Until the baby is 3 months old the night temperature should not go below 65°. When the baby is 3 to 12 months old the nursery temperature should go to 55°, and after that age 45° is proper. The nursery should be aired twice a day. The baby over a month old should have a daily airing in the room. After 3 months old he should have an airing outside in all except the worst weather. *To sleep outside for a while*

each day gives the youngster a new impulse to live, grow, and become resistant and strong.

The best use to make of physicians is to employ their services to direct the methods of living that there may be no illness or that right living may earn a cure for the disease brought about by wrong living. This plan is frequently followed in the treatment of consumption and certain nervous diseases. There is a growing disposition to use the services of physicians in this way in the rearing of babies. It is to be hoped that the reading of articles such as these and of books such as Holt's "Care and Feeding of Children" may induce people to follow the right rather than the wrong method. The present method is to pick up from advertisements, grannies, and neighbors, methods of care which are wrong about as often as they are right, and then to rush off to the doctor to have him rescue the baby from the position where wrong methods have put him.

DANGER SIGN WITH BABIES

Perhaps the time will come when it will be the custom to consult one's physician once or twice a year for direction as to keeping well. That is a long way off. Perhaps the time will soon come when a mother will take her well baby to the physician once a month during its first year that it may keep well.

In summer it should be the custom to see the physician when babies' bowels get loose. Kilmer advises that all food be stopped, a dose of castor oil be given, and the doctor sent for.

A baby may have loose bowels and be in good spirits, no more irritable and no more upset physically than a thoroughly well baby. Nevertheless, the mother has a harder time judging the right course to follow when the bowels are not just right. She will make fewer mistakes, if she will take counsel promptly.

If the stools are green as well as loose, the hazard becomes greater. The baby may still pull through all right, in fact usually does; but it is quite risky for the mother to rely only on her own judgment as to what to do.

If the stools contain mucus, either with or without green, the mother is certainly at a point where she needs help. Some mothers work it out successfully without help, but the risk is too great. If there is blood, or if the baby has fever, or is exceedingly irritable, or is nauseated, it is imperative that counsel be obtained.

Let us make clear these gradations:

Any baby with diarrhea should be seen by a physician. In simple diarrheas the risk in disregarding this advice may not be great.

If there is blood in the stools, or the baby has fever, the risk in disregarding the advice is extremely great.

As Kilmer says, as soon as loose bowels appear, food should be stopped and a dose of oil given. Water will usually satisfy for a while.

Too much food in hot weather is almost as bad as bad food. After the system has rebelled against too much food, it will continue its rebellion against any food for a while.

The diarrhea usually has an object, although it accomplishes that object in a harmful way. The object is to rid the digestive apparatus of something that is troublesome, and that is why the advice is to give a dose of oil to begin with.

Neglected diarrheas are responsible for the heavy baby death rate. For a while after the diarrhea starts, the baby is not much disturbed. The condition is not serious.

If neglected, the child slowly drifts downstream, and presently is caught in rapids from which there is no escape.

It is the mild, neglected conditions of early summer that result in the severe, hopeless conditions of midsummer. Therefore the advice to the mother is not to try to manage the ship without help after things have begun to go wrong.

BABY'S CRY

There are several situations in which it is desirable that the baby cry. When first born the lungs are collapsed. A good cry is needed to expand them. If not expanded properly they may not get right for days; in fact, may never get entirely right. Therefore if the baby does not cry of his own accord, he should be made to cry, and the harder the better.

FIG. 284. — CORRECT METHOD OF HOLDING A BABY. (Kilmer.)

If, later in life, baby is in a shock, or the feet are cold, nothing warms him up quick or better than a good hard cry.

In some conditions of tension a good skin-warming cry is good for baby.

On the other hand in the great majority of instances the question is: What is the meaning of a cry and how can it be avoided? Kilmer gives a number of conditions which cause a baby to cry. They are:

FIG. 285. — INCORRECT METHOD OF HOLDING A BABY. (Kilmer.)

1. He is hungry.
2. He is thirsty.
3. He is in pain.
4. He wants attention.
5. He is sleepy.
6. His napkins are wet.
7. He is tired of lying in one position.
8. He is frightened.
9. He is exhausted.
10. He is crying from temper.

The cry of hunger is continuous and the baby sucks ravenously at his fingers or anything else that gets in his mouth. After he begins to eat he may interrupt his meal to cry once or twice, but shortly he quiets down.

A thirst cry is of about the same type as a hunger cry. It yields to a few drams of water.

The colic cry is intermitting. When the pain is on the yelling is violent. Generally the limbs draw up more than in other cries.

A cry from a pin prick is continuous and sharp.

He wants attention. Kilmer's page on the folly of spoiling a baby is worth the price of the book. If a baby is not born with a rupture, crying will not develop one, Kilmer says. A mother will save herself trouble when the cry is because the baby wants attention by letting him cry it out. She will save the baby trouble. A crying baby heats his skin, cools his digestive apparatus, and invites summer complaint. A spoiled baby is the first link in a chain of spoiled beings—baby, child, youth, adult.

A sleepy cry is to be diagnosed by the time since sleeping and the conduct of the child.

No cry is more trying than the feeble moan and fretful outcry of a baby exhausted by illness. The cry is an almost continuous, low call with occasional sharper sounds.

Kilmer tells us that tears do not necessarily mean that the baby is crying from pain. Not infrequently a youngster will cry so hard from temper that the tears will flow.

THE BABY'S NERVES

A baby is born with an enormous brain and soon acquires an enormous appetite. This is about all there is to start with. The size of his brain as compared with his body is greater than it will ever be again.

James Lane Allen in "Aftermath" makes *Adam* say of his newborn son: "If I could put forth one protecting prayer that would cover all his years it would be that through life he continue as wise as the day he was born."

Parents should watch over the baby's digestion with even more care than they have been accustomed to, but nothing warrants them in leaving the nervous system untrained or training it improperly. The young baby seems to have so little mentality that there is great temptation to begin teaching him things, and then, when a little spark of intelligence is shown, the temptation to build further and faster is almost irresistible. His brain is in the rough and needs to be properly trained just as his method of taking food and air is new to him and needs training.

The foundation of much of the nervous instability of adult life is laid in the self-centering, nerve-racking methods frequently employed with babies. Holt says: *"Babies under 6 months old should never be played with and the less of it at any time the better."*

When a baby has been nursed he should be put down on the bed and allowed to go to sleep without rocking, patting, or attention of any sort. He should not be given pacifiers or soothing syrups. He should not be allowed to form the habit of sucking his thumb. He should be trained to lie quietly, unheld and unnoticed, when awake. He should be trained to sleep through the

night with waking times prearranged according to age. If, at other times, he awakes and cries, he should be allowed to cry it out.

At the worst only two or three nights are required to reëstablish proper routine. He can be trained to proper bowel habits very early in life. He should not be stimulated to "take notice" or sit up or crawl or walk. If he is healthy he will get these things as soon as he is ready. He will walk when his legs are strong enough. It harms him to walk before.

Distinctly from the standpoint of impressions, babies should be left alone. As it is, their brains are all out of proportion to their physical qualities and the need is to go slow on nerves so that muscles and frame may grow to somewhere near a balance.

It is easy enough to tell a nervous baby. If the mother is at all observant she can diagnose the condition as well as the doctor. He knows more and has seen more babies, but she is on the job all the time and he is observing for brief periods.

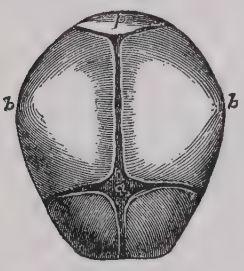


FIG. 286.—BONES OF A BABY'S SKULL SHOWING "SOFT SPOT." *a*, anterior fontanelle; *p*, posterior fontanelle; *b*, *b*, parietal eminences.

Nervous babies cry frequently or overhard or overlong. If old enough to laugh the laugh is nervous or excessive. The child wakes easily, jumps at noises, and seems on edge. A little excitement may cause vomiting. As nervous babies respond to being walked or jogged or other forms of attention they are apt to be spoiled. The nervous baby is apt to grow into the nervous child, and he in turn into the neurasthenic or neurotic adult.

What is to be done about it? Above all else these babies must be trained to regular habits. Feeding must be at regular intervals—four hours in the day and six at night. They must go to sleep at regular hours. They must not be handled, admired, or trotted, walked, or put to sleep. They must not be entertained. They must live in the open air.

The diet must be carefully watched. As they do not digest sugars and fats well the diet must not have too much of these. As they stand starch well they can have a good deal of gruel. Nervous children over a year old do well on vegetables and cereals. Meat, eggs, and large quantities of milk are not well borne.

Somewhat allied to the nervous babies are those with a tendency toward convulsions—general spasms or spasms of groups of muscles. The children who are very prone to croup belong to this group.

Physicians who have had training in this work can test the nerves with an electric machine, and in this way tell which babies belong in the tendency to convulsions group and which do not. Even though the child is thriving, growing, and seemingly well poised, this test shows a nervous instability out of which some form of spasm is liable to result from any strain.

This spasm tendency rarely develops in babies under six months of age. It rarely develops in breast-fed babies, showing another way in which a mother may spare herself trouble and her baby danger by continuing breast feeding.

What is to be done for these babies? They must be kept in the open air. They must get a nap in the outside air every day that the weather is fit. They must be kept clean.

These children bear starches very well. This may be taken advantage of in feeding them. Dr. Grulee's book on infant feeding recommends milk curds suspended in arrowroot water. But the method of feeding to cure a tendency to spasm is too complicated for a mother to work out by herself. It is not wise for her to try it. She should leave it to a physician or nurse who has had training in this kind of feeding.

It is a diathesis which is quite amenable to dietetic treatment. To limit what one tries to do to controlling the spasm is not enough. An effort must be made to feed the child out of the tendency.

FAT BABIES

What use has fat? There are two uses. When life was simple, animals, including man, ate a great excess of food in the season of plenty, laying up the excess as fat. In the season of little food the animal pieced out by using up the stored fat. We still see wild animals begin the winter round and sleek, and come out in the spring poor and scrawny.

Fat is a poor conductor of heat. Fat animals suffer less from the cold than do lean animals. To assist in keeping the body warm in winter is then the second use of fat.

Well, now let's see how that fits the baby case. No mother intends to get her baby through next winter without plenty of food. That, as a reason for fattening baby, does not work.

In the hot weather the problem is to keep baby cool, not warm. The second use of fat as a reason for fattening baby does not work.

There must be some reason that so many mothers want their babies to be fat.

The reason is this: Most sick babies are thin; therefore, as sickness and thinness go hand in hand, fatness and wellness must go hand in hand, reasons the mother.

The fatness of her baby is proof of its wellness, and naturally every mother is proud to show her fat baby, because it means that it is a well baby.

This third use of fat—to serve as a measure of health, like a thermometer or barometer—works fairly well from October to June, but between July and October the mother had better substitute some other way of proving to the neighbors that she treats her baby wisely and well.

In exceedingly hot weather fat babies suffer more than lean ones. In consequence they cry and fret more and thus make more heat. Heat makes them cry, and crying makes heat—a vicious circle.

They are more subject to summer complaint. Milk that is just a little spoiled will make a fat baby sick, but will not harm a lean but healthy baby.

The fact that a baby gets fat is proof that its digestion or its diet or both run to fat making, and that means to heat making. When things go wrong with fat babies they wilt quickly. They seem to have little resistance.

The conclusion to draw is that a mother should slightly underfeed her baby from July to October. The weekly rate of growth in weight should be about half that of the winter.

It will be well if the increase in weight is due to growth in length. The baby will be safe if the dimples gradually disappear.

COUNTRY BABY DEATH RATE

Country babies are not getting a square deal. The city babies are being safeguarded, and they are healthier in consequence. The census bulletin for 1911 shows that every large city is taking better care of its babies than of yore.

The decrease in the death rate is about 50 per cent in New York, Atlanta, and Los Angeles. The average was around 30 per cent.

The only cities showing an apparent increase were Minneapolis, St. Paul, Syracuse, Rochester, and Portland, and this apparent falling back is due to a change in the method of recording.

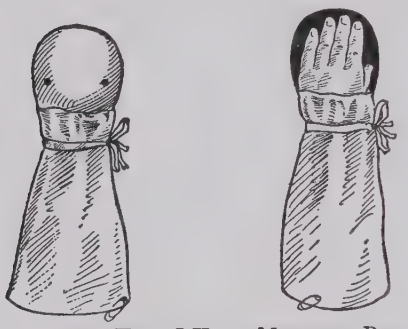


FIG. 287.—HAND-I-HOLD MITTS TO PREVENT THUMB SUCKING. (Courtesy of R. M. Clark & Co., Boston, Mass.)

In the few states where registration is almost what it should be, the decrease in baby death rate averaged 19 per cent. Michigan made the worst showing with a gain of 8 per cent. After allowance is made for the gain in the larger cities, 16 per cent in Detroit, the figures show that the rural districts lost.

As the good things are being passed around, the city baby empties the platter, and the country baby gets none. Why is this? The mother in the country knows that her baby is safer than the city baby. Therefore she says, "My baby is as safe as it can be." Of course she is wrong.

In the first place, there is not much difference any more between the safety of the city and country babies. There are a dozen cities in America where babies are safer than in rural Illinois, Michigan, or Iowa. In the second place, the country baby could be twice as safe as he is.

I have before me an excellent "save the babies" bulletin, issued by the Iowa Board of Health.

The country baby can always get milk fresh from the cow. There is no reason why milk more than ten hours from the cow should ever be given. As the cow is close at hand, the mother can always see that things are clean.

On the other hand, flies are more abundant in the country. Doctors and nurses being harder to get, there is a greater chance that a mild diarrhea will be not attended to.

Baby, living in the country, has disadvantages as well as advantages. The disadvantages are not so great as the advantages, and they can be surmounted. The mother of the country baby can learn from simple pamphlets such as the bulletin of the Iowa Board of Health, from simple books such as Holt's, Kilmer's, or Smith's, how to surmount these difficulties.

It would be easily possible to cut the present rural baby death rate in half.

The first need is that the mothers become dissatisfied with the policy of "let well enough alone." The second need is that the information "how to do" be carried to the country homes.

HEAT KILLS BABIES

It is heat that kills the babies. First get that in your mind. Swing on that as a definite fact, for, when we begin to make some modifications of the statement, the original idea may slip away from you.

In a table of mean temperatures published by the Chicago health department July is shown to be the hottest month both in average mean temperature and in number of hot days. August is second in the list of bad months, June is third, and September fourth. May is fifth and October sixth.

When it comes to death rate from diarrhea among babies, August is much the worst month. September is second, July third, October fourth, June fifth, and March sixth. The death rate curve is not parallel with the temperature curve.

What is the reason? There are several. Diarrhea is seldom rapidly fatal. The rule is that the disease wears down the vitality for a month or more and then kills. October has a high death rate when September is hot.

Baby may come through a hot July without getting sick; at the same time he is not quite up to the standard. He has resisted the effect of the heat, but he shows the strain. In August he gets sick from some cause which would not have upset him earlier in the season. He dies in September.

We have already noted that the top of the death curve lags after the top of the heat curve. The top of the sickness curve also lags somewhat.

The heat is in the house. The room air of a thin walled house is the hottest air. Or when the baby has escaped the effects of room air made hot by the sun, he may fail from the effects of room air made insufferably hot and humid from a kitchen stove or laundry tub.

Therefore, we may come back to the opening statement. It is the heat that kills babies. When it seems otherwise a closer analysis explains the apparent discrepancy.

Sometimes the heat gets in its work on the milk. The remedy for this situation is ice. A newspaper campaign for ice for the poor is a health campaign.

Sometimes the heat gets in its work on the baby directly. The remedy for this situation is to get the baby to a cool place.

Some hospitals take care of babies in summer with air artificially cooled. Some sanitaria for the care of babies in summer are built over large bodies of water; others high up in the mountains.

Each of these works on the principle that it is heat that kills the babies.

BABIES IN HOT WEATHER

The problem of keeping babies well in hot weather is, in part, a milk problem. Hot weather spoils the milk. Spoiled milk spoils the babies. Hot weather spoils the babies, even those who get unspoiled milk.

But another part of the hot weather problem is the baby itself. In a rough sort of way the baby's food is burned up into energy of four kinds: first, that which is built up into tissue; second, that which is used up in action; third, that which is piled up as fat; fourth, that which is made into heat. I say roughly, because you cannot say of one food element, "This goes into tissue," and of another, "This goes to fat," and have the elements stay where they were put. Within certain limits they swap around. A lamp may make light or heat or smoke; it may burn oil or it may burn the wick.

Kansas State Bulletin.

FIG. 288.—HOW TO PLACE BABY IN HIS BATH.

The *American Practitioner* quotes Professor Abderhalden of Switzerland as saying: "The cells of our bodies never learn what the character of the food we eat really is."

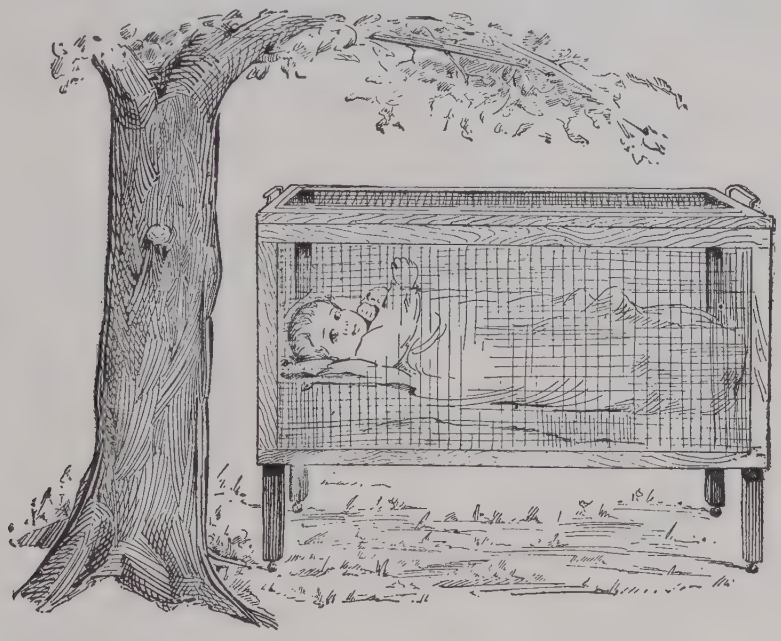
In the winter time a baby needs to make considerable heat and also needs bands and wraps to prevent its rapid radiation. In the summer time the restless, kicking, active, healthy baby always makes heat in excess, and the great problem is how he shall get rid of it. The air is nearly as hot as he is, and, therefore, cannot take up much of his heat.

Not only is the baby made uncomfortable but often he is made sick by excess of heat. Some of the best doctors think most of the cholera infantum is heat stroke. What can be done about it?

In the first place, the amount of clothing can be cut down as much as the law allows. A pickaninny clothed in a promise is pretty near the proper thing when the temperature is 100° and the wind is holding from the southwest. I should say that *all doctors are agreed that much of the summer sickness in babies is because they make heat faster than they can well get rid*

of it. A band over the abdomen is all right on the cool days in summer, but it must be removed when the temperature in the shade goes over 80°.

In the second place, the food can be cut down, particularly the fat elements. Advise with the doctor about keeping the baby on buttermilk or skimmed milk while the weather is very warm. While it is important that the baby should not get much cream or butter during the extreme hot weather,



Kansas State Bulletin.

FIG. 289.—SCREENED BED FOR OUT-OF-DOORS SLEEPING.

it is also desirable to reduce slightly the quantity of food taken. This can usually be done if the baby is given plenty of clean water to drink.

Let the mother whose baby is thin forget her wish for a fat baby until the cold weather comes. Let the mother who has a fat baby watch it carefully—for hot weather threatens the fat baby worse than ever hawk threatened a chicken. And, in addition, the baby can be kept in the coolest part of the house, or on the roof, or out of doors, or in the park.

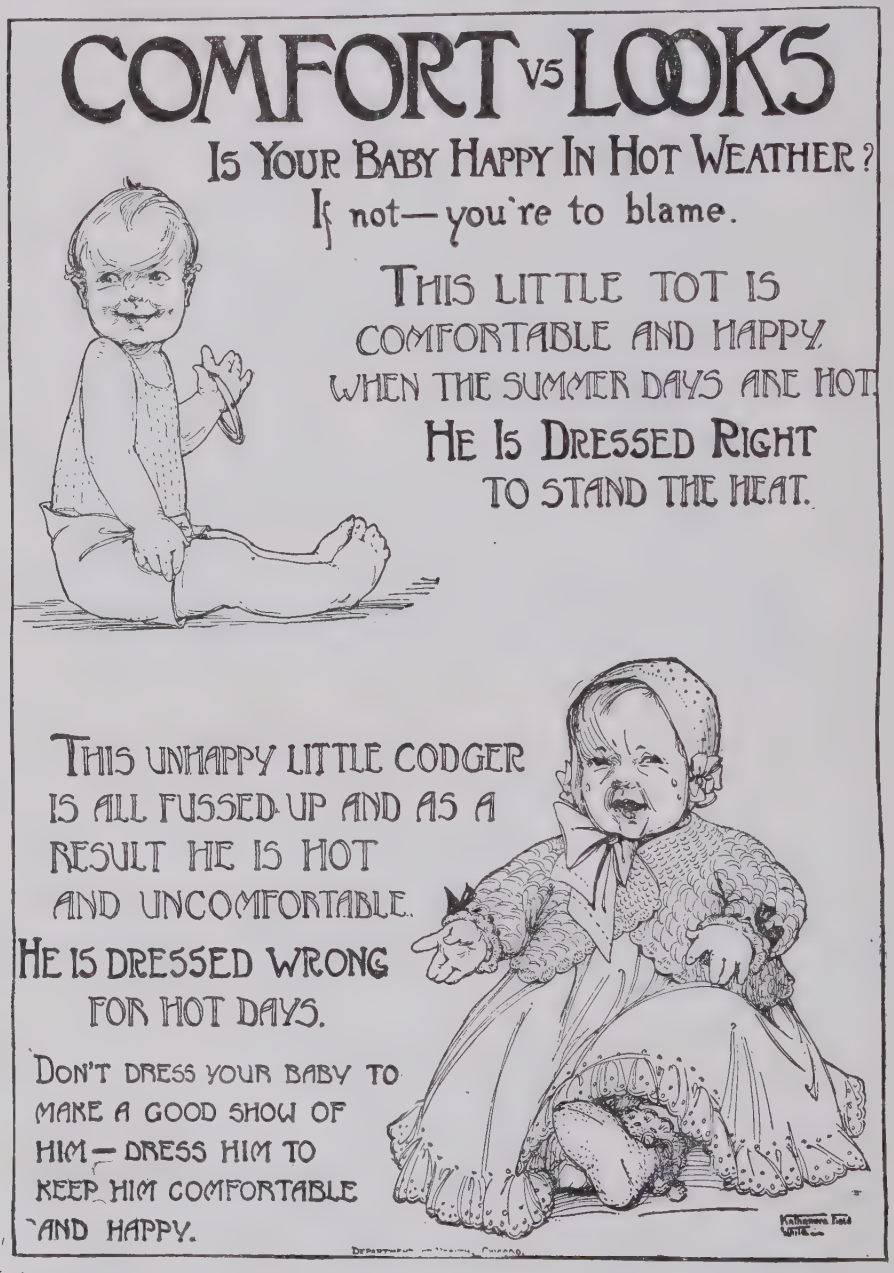
SUMMER COMPLAINT

Summer complaint in babies has some resemblance to contagious diseases. Many hold that it is caused by a germ. Where babies are crowded together, as in a baby hospital, the sickness rate from summer complaint is fearfully high.

There was some reason for holding that summer complaint, like some other forms of contagion, is spread by flies. The New York Merchants' Association had proved summer complaint was at its worst near the wharves,

where badly infected flies abounded. Levy had shown that in Richmond a fly campaign lessened the baby sickness rate. Nevertheless, exact evidence was lacking.

Last summer the bureau of public health of the New York Association


COMFORT VS LOOKS
IS YOUR BABY HAPPY IN HOT WEATHER?
If not—you're to blame.
THIS LITTLE TOT IS COMFORTABLE AND HAPPY WHEN THE SUMMER DAYS ARE HOT.
HE IS DRESSED RIGHT TO STAND THE HEAT.
THIS UNHAPPY LITTLE CODGER IS ALL FUSSED UP AND AS A RESULT HE IS HOT AND UNCOMFORTABLE.
HE IS DRESSED WRONG FOR HOT DAYS.
DON'T DRESS YOUR BABY TO MAKE A GOOD SHOW OF HIM—DRESS HIM TO KEEP HIM COMFORTABLE AND HAPPY.

Chicago State Board of Health.

FIG. 290.

for Improving the Condition of the Poor decided that it would try to get exact evidence. Dr. Armstrong picked out two neighborhoods in the Bronx where conditions were as nearly the same as it was possible to find. In each area were 311 families. In the protected area there were 1,725 individuals; in the other 1,744. The numbers of babies under one year were 100 and 98; under two years, 175 and 160; one to five years, 262 and 298.

The sickness in the two neighborhoods was closely watched. In the protected neighborhood Dr. Armstrong's forces screened the houses and provided fly swatters, fly paper, and fly traps. They furnished covered garbage pails. They kept the premises clean and saw to it that stable manure did not serve as a breeding place. In the other area they did nothing except register all illness.

They were able to reduce greatly the number of flies. They found that the flies caught in the cleaned houses average 14,000 bacteria; those from the dirty houses, 1,100,000.

Two babies died in the protected area, six outside it. The possible fly-borne illness of the protected area amounted to 22 cases; of the unprotected area, 65. The total days of baby sickness in the flyless area was 273; in the fly area, 984. The cases of summer complaint in the flyless area were 20; in the fly area, 57.

This experiment proves that flies are one of the factors in summer complaint. There are others. But by attending to this one we can reduce the amount of baby sickness materially.

Incidentally the following facts were found: It costs nine-tenths of a cent per day per horse to treat stable manure with iron sulphate so as to make it fly-proof. The stableman would not do the work, even when the iron sulphate was furnished him. One per cent of the flies captured in this city area were biting stable flies.

Screens did little good. When the weather was hot the people took them out. Cleaning was more effective than screening. Efforts against breeding places were most effective.

The house to house daily visits extended from July 21 to September 13. When visiting was resumed on November 1 it was found that the customs and habits of the people had gone back to the old basis.

DIARRHEA—ITS TREATMENT

Diarrhea is more prevalent during the summer months. It reaches its maximum curve some time in August. This shows that it bears a relation to temperature and other atmospheric and telluric conditions. In the treatment of the disease it is necessary, therefore, to have in mind the season o the year and the agencies which hasten or retard recovery.

Since food has much to do with the cause of diarrhea, in the treatment of the disease great care should be observed in preparing the food. If the cause of the attack is located in the mother's milk, the baby is to be kept away from the breast and fed artificial food.

The best of all artificial foods is cow's milk. Cow's milk easily undergoes fermentative changes in itself and is often contaminated by specific poison.

Before it is fed to the child it should be pasteurized. Where it is possible to obtain it, certified milk is preferable.

As soon as it is discovered that the child has diarrhea, all food should be withdrawn. It should be put to bed in a room where absolute quiet can be maintained. A dose of castor oil should then be given, and, if there are signs of fever, it should be given a sponge bath with tepid water. If the baby does not show signs of improvement within twenty-four to thirty-six hours, a physician should be called.

Where the disease assumes a dysenteric nature, it may be several days before the child takes a turn for the better. In this case it would be fortunate if the treatment could be carried out under the supervision of a trained nurse. The main thing in this type of diarrhea is the nursing, and unless one has been trained in nursing, strict and accurate instruction from the attending physician should be given in regard to each detail connected with the treatment, all of which are to be rigidly carried out.

The child should be kept in bed except, in the case of a breast-fed child, when it is taken up to be fed. The patient should not be handled, and walking the room with the child in the arms is especially forbidden.

The room should be kept cool, quiet, and provided with plenty of fresh air. The bedding should be changed frequently. Cleanliness is especially necessary. The napkins should be removed as soon as soiled and placed in a sterilizing solution, then washed and boiled. After the napkin is removed, the parts are to be carefully washed and thoroughly dried before redressing.

When it is necessary to resort to medicine in the treatment of these cases, a careful physician must be called.

COLIC IN BABIES

Of course, colic is only a symptom, but when a mother has had to worry with a colicky baby for a week or two she is not disposed to give much thought to finely drawn divisions between diseases and symptoms. She wants to know what to do.

The first thing for her to do is to be certain that the apparent colic is the real thing. In a very young baby colicky pains are not due to gas in the bowels as often as they are to gravel in the kidneys. The young baby is apt to have plugs of uric acid crystals in the kidneys. These cause pain.

Older babies are sometimes thought to have colic when they are suffering from congenital syphilis. When the cry results from syphilis, treatment for that disease must be given. Sometimes a hunger cry is mistaken for colic; or the cry is due to anger—the child has been spoiled.

In some cases of colic, clearly gas is the cause of the pain. If the gas is in the stomach, holding the baby upright or laying him on his stomach may cause the gas to come up. If the gas is in the intestine, trotting or changing position may give relief. An injection may cause the expulsion of gas.

However, every mother of a colicky baby knows that the importance of gas as a cause of pain has been overrated. Sometimes the passage of gas stops the pain; more frequently it does not. A turpentine stupe to the abdomen or a hot bath will relieve the pain more often than measures to cause gas to

pass. In some cases paregoric is necessary. Holt says a baby one month old may take one minim; one three months old, two minims; one one year old, five to ten minims.

Mothers, though, are even more interested in preventing colic. The chance is that the colicky baby feeds too frequently. The babies who are fed once every four hours during the day and every six hours at night are not the colicky babies.

The most frequent cause of colic is taking food into a stomach that has not had a resting spell. A baby's stomach cannot digest a meal, empty, and rest in two hours.

If the baby is at the breast either he should be given a little water just before feeding or else his time at the breast should be limited to five minutes, or even three. If the baby is on the bottle, the indication is to decrease the richness of the food.

It may be advisable to put the baby on skimmed milk, one and one-half ounces for each pound of the baby's weight. To do this a little malt extract and sufficient water is added. Gradually whole milk is substituted for skimmed milk. The element in the milk which is most at fault is fat.

Dr. Grulee tells us that in colic calomel does no good and castor oil may do harm.

FIG. 1291.—FEEDING TUBE FOR PREMATURE BABY.

DYSPEPSIA

Babies are subject to a form of mild indigestion called dyspepsia by some physicians. It is characterized by vomiting, diarrhea, distention of the abdomen, gas, and a mild fever. There is a slight loss in weight. There is restlessness, nervousness, and peevishness. The baby is not very sick, but if the condition is neglected it may develop into a much graver condition.

The cause of the condition is overfeeding. Babies that are fed whenever they cry are very apt to develop it. In older children injudicious feeding from the table is a frequent cause. Cakes, bacon, gravy, vegetables, coffee, and beer are often fed to young children, and in consequence dyspepsia develops.

In nursing babies, whether at the breast or the bottle, the condition may come on because of an inability to digest sugar. Less frequently the trouble is an inability to digest fat. The excessive amount of sugar in sweetened, condensed milk, of milk sugar in evaporated milk, and malt sugar in many of the baby foods is a frequent cause.

Bad milk is a very frequent cause. Grulee's book quotes Blum as having seen some cases that resulted from feeding milk from cows that were using green alfalfa hay. A Michigan physician once wrote me his reasons for thinking the condition due to weeds eaten by cows in the pasture.

In those cases where the cause is an inability to digest sugar a good deal of gas forms in the intestines. There is belching, the abdomen is distended, colic is present, and the stools are foamy. If malt sugar is to blame

FIG. 292.—A, NIPPLE WITH PROPER PERFORATION; B, NIPPLE WITH FAULTY PERFORATION, PERMITTING MILK TO RUN TOO FREELY.

the stools are usually brownish. If milk or cane sugar is to blame the stools are grass green and contain mucus and curds.

If the trouble is with fat digestion there is less gas and the abdomen is not much distended. The stools may be fatty, containing oil globules, fat curds. There may be a history of fat constipation—the constipation so frequently found in babies fed on milk too rich in fat.

What is to be done about it? Cut off the food supply. Give plain water or barley water sweetened with saccharin for a day, then begin feeding a mixture of skim milk and water—one ounce of skim milk to each pound of baby—as a day's ration. The amount of skim milk is increased until the baby is getting one and one-half ounces per pound of weight per day. Then whole milk is gradually substituted for skim milk.

It is important to decide whether the fault lies with the sugars or the fats, since the food must contain one or the other when it cannot contain both. It would not do to increase the fat in a case where fat was the cause of the trouble and it would be equally harmful to increase the sugars when they were the food element that was disagreeing.

EYE OF THE CHILD

Kittens are born blind. When seven days old they get their sight. Such, at least, is what I learned as a boy. One statement is an exaggeration. The other is less than the truth. Kittens when born are nearly, though not totally, blind. They have no caul over their eyes. Their eyes are merely unseeing. Sight does not suddenly come to them at seven days. It comes little by little. At the end of seven days they see poorly.

Bad as that seems, the case is worse with babies. They are born blind, or practically so. Not that there is a caul for witchcraft to remove. The eye as a piece of mechanism is as complete as it will ever be. Rays of light enter it. Images are formed on its mirror. But no impulse travels from the eye to the brain.

At the age of 3 months the brain and the eye have hooked up enough so that the baby will watch a bright light. Not until the normal child is 7 years of age is the eye normally good. After that the sight may train on. Apropos of this Dr. Shaw tells us that to Professor Lowell, whose sharp vision permitted him to discover important details about the canals on Mars, the ordinary man was telescopically blind.

There are some eyes which are perfect in appearance, and in which careful examination shows no defect, which are incapable of good sight—at least without special care. For some of these nothing can be done; for some much can be done. If they could be picked out at the beginning of school life and then taught with the development of sight in mind, they could become efficient.

At the same meeting at which Dr. Shaw discussed this group of children with poor sight Dr. Parke Lewis discussed the reasons for nearsightedness in school children. The farsighted eye is one that is too shallow; the nearsighted eye, too deep.

"The shape of the eye, as has been shown by careful measurements of the

cranial bones, is determined by the shape of the skull, and this in turn is inherited from our ancestors."

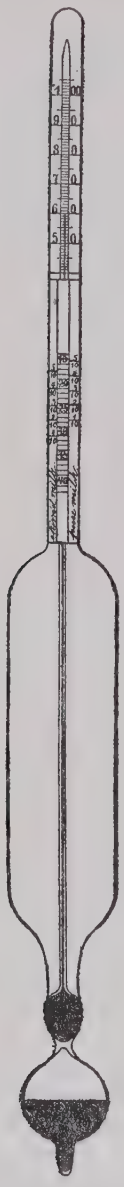


Fig. 293.—Lactometer for Testing Milk.

Most babies are farsighted—their eyes are shallow. If they try to look at near objects their eyes cross. It is rare, however, for a baby's eyes to show the effects of strain. They do not use them enough. By the time school age is reached the bones of the face and head have determined the shape of the orbit. The eye is often found to be too deep—nearsighted.

Whatever may be its variation from the normal—be it nearsightedness, farsightedness, or astigmatism—the strain of routine school work causes a "tugging at the sensitive portion of the eyeball." Certain fibers begin to stretch. Hence, as Dufour has said, "The number of shortsighted pupils increases from class to class. The degree of shortsightedness likewise increases."

The remedy for this proposed by Dr. Lewis is that the sight of all children be examined at the beginning of school life, and that those whose eyeballs show that they are destined to shortsightedness be taught without books or with little book work.

WEANING THE BABY

Sooner or later the nursing baby must be weaned. It must learn to build its bones and muscles out of the materials provided by nature. Sucking is very often cut short, and, not infrequently, unduly prolonged for the pleasure of the mother. This is wrong and injurious. The good of the child should be the only consideration, providing the mother is healthy.

When should a baby be weaned? Most nursing mothers are careful not to wean their babies during the hot summer months, which is a very good practice. Other considerations which are of equal and perhaps greater importance are little known and hardly ever taken into account by the great majority of nursing mothers.

A healthy child should ordinarily be weaned between the ninth and tenth months. About the sixth or seventh month the front teeth appear—an indication that the system of the child is getting ready to take care of other food than the mother's milk.

In weakly, scrofulous children, the appearance of the front teeth may be delayed for several months. There also are hereditary instances of late teething. When the baby shows its teeth it is a sign that it is preparing to take its seat around nature's table.

Another important guide is the weight of the baby. If the baby goes on

increasing in weight, breast feeding can be continued till nine or ten months; if the weight becomes stationary, or, what is worse, begins to fail, the baby should be weaned, irrespective of its age.

The point is that it is not a matter of age in terms of months—it is rather a question of physiological advancement. Some children are as far advanced at six months as others are at eight. The state of growth and

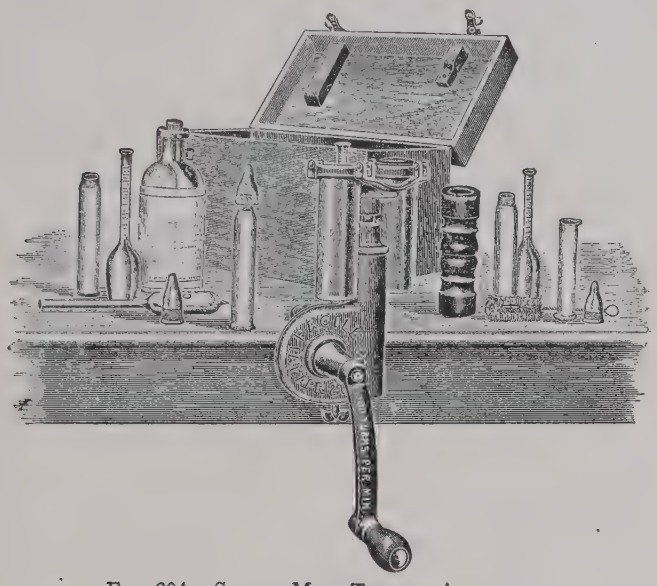


FIG. 294.—SIMPLE MILK-TESTING APPARATUS.

ability to take care of other food are better guides than the mere age of the child.

Ordinarily breast nursing should not be prolonged after the tenth month. If the mother suffers from any serious illness, acute or chronic, it is best to wean the child earlier. Pregnancy also necessitates earlier weaning.

As to the season, the best time to wean a child, everything else being equal, is in early spring or fall. Keeping the child out in the open air is very soothing to its irritated nervous system at the time of weaning.

A child should be weaned gradually. Sudden weaning, much practiced in former years, does much harm to mother and child.

When the first teeth appear, along in the sixth or seventh months, a healthy child should be given some other food besides the mother's milk at stated intervals. Four ounces of milk, with the addition of two ounces of barley water, may be given. In about a week these

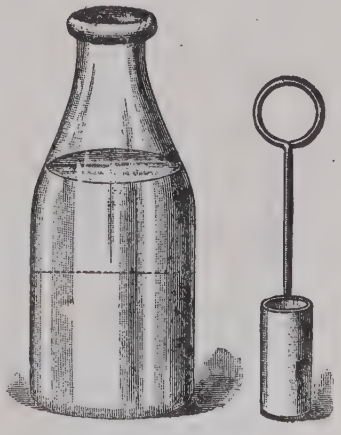


FIG. 295.—CHAPIN DIPPER FOR REMOVING TOP MILK.

feedings may regularly alternate with the nursings. After a while a little chicken or beef broth may be added.

If the child is in this manner gradually accustomed to take other food, it will sometimes voluntarily give up the breast. At any rate, the breast will not be missed much when it is entirely withheld. The cases where the child will refuse to take other food than its mother's milk are rare and require expert management. Thus managed, there ought to be no evil results to the child from weaning.

A frequent source of trouble and disease at this period is an oversolicitous mother, who thinks that the baby always is hungry and will give it *too much food.* The more food the baby gets the more irritable it becomes, and it cries, not of hunger but because of overfilling, pain, and discomfort. This cry frequently is misinterpreted, and more food is given, and a vicious circle is established.

The diet after weaning should consist of milk and barley or oatmeal gruel, chicken or beef broth, some stewed fruit, orange juice, zwieback, and, a little later, some soft-boiled eggs.

Last but not least, give the baby plenty of water to drink.

WEIGHT DISTURBANCE IN BABIES

The babies who come in the class suffering from so-called weight disturbance are artificially fed. Rarely does the condition develop in the breast-fed. Dr. Grulee says that this is a disease of babies of the well-to-do and that it is much more frequent in winter than in summer.

The reason for this is that it is in a certain sense a midway condition. The babies are not right, but then they are not very ill. The same condition developing in the baby of a poor person or developing in a baby in hot weather would go on to a more serious form of trouble.

The two outstanding symptoms are constipation and fretfulness. Commonly, the mother tells of how her fat baby seemed to be thriving except that he was constipated. A while back she thought he was doing extra well, as his weight increased rapidly. Suddenly the increase in weight stopped. Now for several weeks he has not gained, not even an ounce.

Oh, yes, she will say, he was fretful. Somehow she could not find out what he was fretting about. Maybe it was gas, as a fair amount passed. Latterly she has noticed that his urine smelled like ammonia.

Yes, there was some tendency to eruption. The urine was strong and had chafed around the buttocks. Somehow dusting powders would not keep the creases from getting sore. She could not see why he was not growing and thriving, as his stomach was not upset, his food was agreeing, and he was fat.

The trouble with this baby is that he is not digesting the fat in his milk. In the intestines the undigested fat is being changed to fatty acids. These are absorbing alkalies from the system. The peculiar looking stools are mostly fatty soaps caused by undigested fat. The system, robbed of its alkali to make these soaps, is overacid. That causes the ammonia in the urine. The scientists call this overacidity—acidosis.

What must be done is to give the baby less cream. Commonly they start the baby on the proper amount of skimmed milk properly diluted. In a few days a little whole milk, an ounce or two a day, is substituted for some of the skimmed milk. The addition of whole milk to the diet must be done very slowly. A little ought to be added and the result watched for a day or two before it is tried again. If the stools show fatty or chalky masses the whole milk must again be withdrawn.

But energy without fat is not possible unless something replaces it. The first carbohydrate to be tried as a substitute for fat is malt extract, say half an ounce a day. This can be increased for a few days, and then everything going well malt food can be substituted. Barley water can be given in place of plain water.

Older babies can have cereals or cereal gruels. The child must be kept in the open air as much as the weather will permit. Good air is almost as necessary as good food. Care should be taken to keep the skin clean.

FEEDING BABIES

There are those who hold that the methods of preparing milk for the artificially fed baby have been too complicated. On the one hand they have been too complicated for the best interest of the baby. On the other hand, they have seemed so difficult that many mothers have given their babies condensed milk and baby foods. They had no hope of being able to make the more complex mixtures.

A simpler method is being advocated by some of the best medical men in the country—a method so simple that no one need hesitate to undertake it. This method is not intended for mothers who can nurse their babies. If a mother can nurse her baby she had better do so. It is better for baby. It is less trouble for the mother.

Chicago Health Dept.

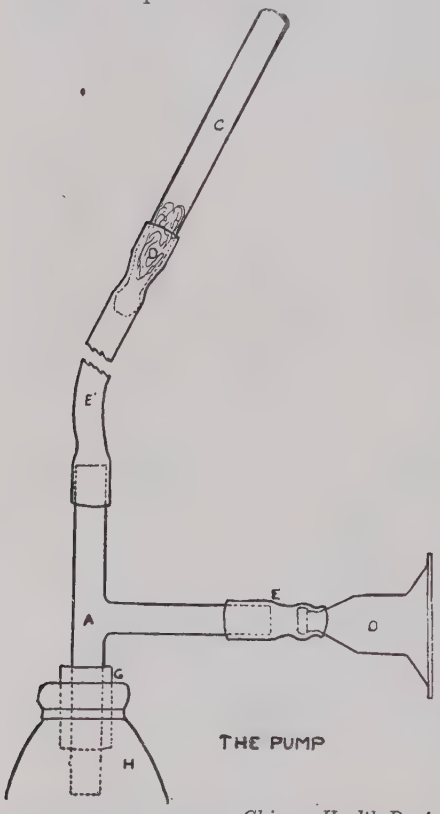
FIG. 296.—BREAST PUMP IN USE.

A good system and one that is widely used consists of a series of nine strengths. No. 1 in the list consists of two ounces of 7 per cent milk, one ounce of milk sugar, one ounce of limewater, and seventeen ounces of boiled water. No. 9 consists of ten ounces of 7 per cent milk, three-quarters of an ounce of milk sugar, one ounce of limewater, and nine ounces of boiled water.

Between these two extremes there are seven mixtures as the series progresses from one to nine. The quantity of milk increases one ounce a step and the quantity of water drops correspondingly.

Seven per cent milk is milk containing 7 per cent fat. It can be bought as 7 per cent milk or it can be roughly guessed at by taking the top pint of a quart of ordinary milk or the upper twenty-two ounces of Jersey milk.

Weighing, measuring for these mixtures, and changing them as the baby gains in age, appears formidable. Possibly it is not so complicated, but at least it appears so. To get away from this is one of the reasons for the simpler system proposed. However, it is not the only reason. Its advocates claim that the simpler mixtures are more easily digested and nourish better.



Chicago Health Dept.

FIG. 297.—DIAGRAM SHOWING CONSTRUCTION OF BREAST PUMP.

The Simpler System.—The basis of the system is that in children under a year of age one and a half ounces of good, clean, fresh cow's milk will furnish all of the food necessary for growth, heat, and energy for a pound of baby for twenty-four hours. Then the first step is to weigh the baby. The baby's weight in pounds multiplied by one and a half gives the number of ounces of milk needed by the baby in twenty-four hours.

As the result of very careful determinations by scientific men, one of whom is Rubner, the man who is responsible for the feeding standards in use in the German empire during this war period, it has been found that a baby needs about forty-five calories in a day for each pound of its weight. One and a half ounces of good milk with the cream on it is a little short of the required number of calories. Instead of using more milk the calories are gained by adding some sugar. The reason that more milk is not used is because one and a half ounces contains enough protein, the food needed for growth, and more than that amount of milk would furnish more protein than the child needs.

Making Energy.—The necessary energy in younger babies may be furnished in the shape of ordinary cane sugar, milk sugar, or malt sugar. Grulee says the best of these is malt sugar, though various forms of starchy foods can be given slowly to displace it at any time after the third month.

In babies over three months old the day's food can start with one-half ounce of malt food and this, within two weeks, can be increased to one ounce.

We have, then, for a baby weighing ten pounds fifteen ounces of whole milk to which has been added one ounce of malt food.

The next question is how much water should be added to it. To determine this it is necessary to know how many ounces a baby should eat in a day. How many times shall baby be fed and how much at a time? The capacity of the stomach at different ages according to Holt is as follows:

At birth, 1½ to 2 ounces.
At three months, 4½ ounces.
At six months, 6 ounces.
At one year, 9 ounces

The next question to settle is the number of times a baby should be fed. The authorities are all in favor of long intervals between feedings. Of course, the policy of feeding a baby every time it cries or in order to put it to sleep is not followed now by anybody who is well informed.

The only people whom I have heard advocate it in recent years are a few women who thought they knew because of practical experience. When asked what the practical experience was they said they had had large families, some of them ten children. When asked how many of their children had died teething they answered, four, five, six, some of them nine out of ten.

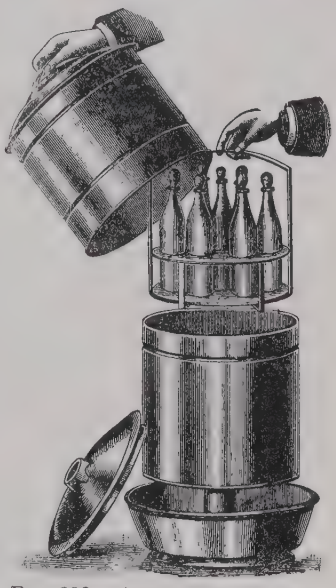


FIG. 298.—ARNOLD STERILIZER.

Intervals of Feeding.—The stomach must have plenty of time to digest one feeding, empty itself, and rest before a new feeding is given. A baby's stomach cannot finish the digestion of milk in two hours. Therefore when a baby nurses within two hours of another nursing the fresh milk and the

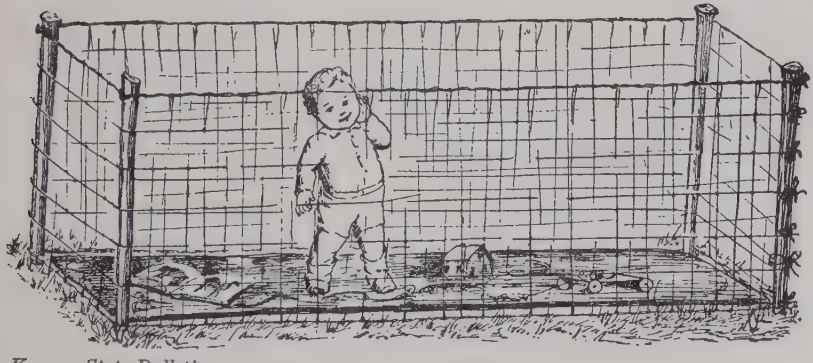


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FIG. 299.—OUT-OF-DOOR PEN.

partly digested milk are mixed, but what is of more consequence, the stomach is kept continuously at work. Everything in nature rests at intervals or breaks down.

The interval agreed on by those who know best is four hours. If a newly born baby is begun on this basis it is simple enough. It becomes his habit. When one has started in on another habit the problem is somewhat more difficult. The feeding hours are six o'clock, ten, two, six, and midnight. This means a four-hour interval during the day and a six-hour interval at night. After the baby is six months old the night feeding can be shifted to ten o'clock, which makes an eight-hour interval at night.

The long interval between feedings gives the stomach plenty of time to complete digestion of the milk and to get a good rest before the next working time.

The long interval plan is not new. It has been tried out for years in

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FIG. 300.—THE RIGHT WAY.

this country. Most of us have heard of the success of Australian and New Zealand mothers with their babies. Only one out of every twenty-four of their babies die. They use the four-hour plan.

With five as the number of feedings and the amount of each feeding for each age known, it is very easy to calculate the amount of food required for the twenty-four hours. In practice Dr. Grulee holds it advisable to give a little more food at each period than is indicated by the size of the stomach in the table by Dr. Holt. He gives to a baby three months old five ounces; six months old, seven ounces; nine months old, nine ounces. Children between these ages take a quantity between these measures.

Amount of Food.—Using these figures as a basis, it is easy to figure the amount of food required. For instance, a baby six months old will take five times seven, or thirty-five ounces of food in the twenty-four hours. If the baby weighs fourteen pounds his daily food supply would consist of twenty-one ounces of milk and one ounce of malt food. In order to bring this

up to the quantity required, thirty-five ounces, it will be necessary to add fourteen ounces of water.

A baby nine months old, weighing fourteen pounds, would take forty-five ounces of food, consisting of one ounce of malt food, twenty-one ounces of milk, and twenty-four ounces of water.

In the first place, this plan is simpler and easier from the standpoint of the mother. In the second—and this does not appear on the surface—it does away with the very elaborate calculations as to percentages of fat, protein, sugar in cow's milk and human milk, upon which the older formulas were based. The foundation of the newer plan is simpler, as well as its superstructure.

Not even age and weight are inflexible guides as to how much a baby can

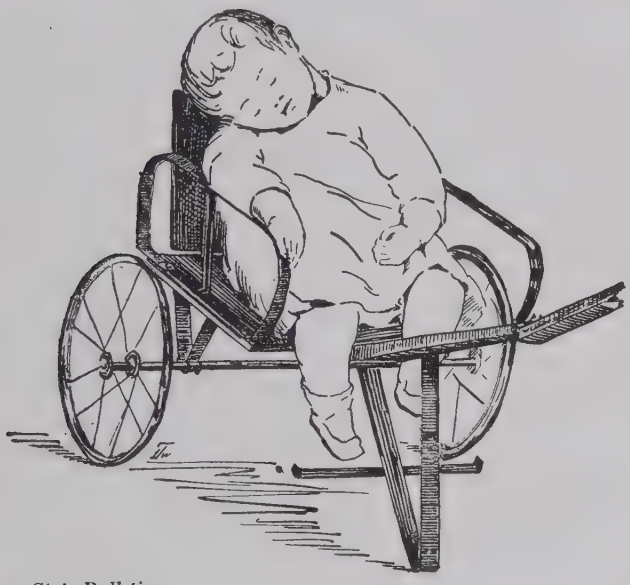

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FIG. 301.—THE WRONG WAY.

or should eat. If a baby fed on this plan does not gain in weight, has no bowel trouble, and goes at his fists as if he was hungry, this mixture should contain a little more milk and a little less water. If he gets too fat, or has colic, or spits up his food, or gets an eczema, he should have a little less milk and a little more water in his mixture.

Older Infants.—After the baby passes nine months of age the problem of feeding becomes much simpler to the careful mother. To the careless one the hazards are greater than when the babies were younger.

What is meant is this: An older baby has very much better digestion than a younger one, but the advantage is often more than offset by permitting the child to eat without regard to the digestibility of the foods eaten.

After the ninth month a thick starch gruel, consisting of one-half ounce of barley flour, oatmeal, or flour ball to a pint of water may be added to the diluted milk. After the tenth month a strained vegetable soup may be added.

A vegetable soup recommended by Grulee consists of a handful of spinach,

a large beet, and two carrots in a quart of water, boiled two hours, strained and diluted to a quart. About this time meat juice may be added. Orange juice may be begun in babies as young as 3 months of age.

The proportion of milk to the weight of the baby should be allowed gradually to decrease. The rule is to give one and a half ounces for each pound of weight. In the latter part of the time the child is at the bottle it is a good idea to decrease this proportion. For instance, when the child is 9 months old, to make it one and a third ounces in place of one and a half. Later one and a quarter ounces is enough. It is never advisable to give a young child more than a quart of milk a day.

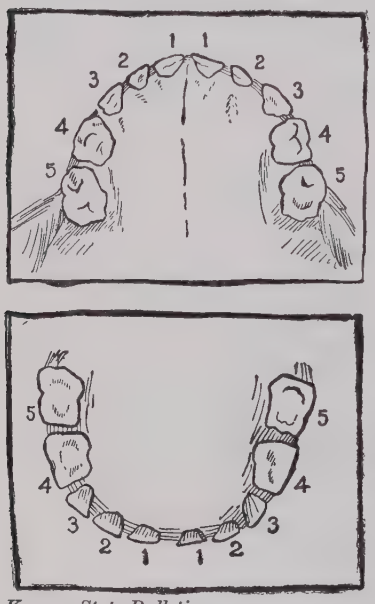

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FIG. 302.—CUTS SHOWING DECIDUOUS TEETH: 1, central incisors. Crown calcified before birth, erupted 5–8 months after birth; 2, lateral incisors. Crown calcified before birth, erupted 7–10 months after birth; 3, cuspid (eye tooth). Crown calcified by 3 months after birth, tooth erupted 14–20 months after birth; 4, first molar. Crown calcified by 6 months after birth; tooth erupted 12–16 months after birth; 5, second molar. Crown calcified by 6 months after birth, tooth erupted 20–32 months after birth.

Second Summer.—The opinion is general that the second summer is the time of greatest hazard to the baby. It is a period of great hazard, but it need not be so. In the case of about half the babies, those born in the spring and summer, the first summer is not a teething period. The second summer is a teething period for all babies.

The food during the first summer is entirely in the hands of the parents. That of the second summer is sometimes contributed to by outsiders; the child himself may slip something unawares; the parents are disposed to be less careful the second summer than they were the first.

During the second year milk should continue to be the chief element of diet. The first additions are usually fruit juices, crackers, and cereals. At the fifteenth month spinach, beets, carrots, and potatoes may be given. Meat juice, thinner gravies, and butter are given to advantage. At about eighteen months chicken, meat, and fish, finely chopped and well cooked, may be added. The habit of giving the child a bone to suck as a method of starting the use of meat is a good one.

Under Three Months.—Feeding a baby under three months of age will not concern many readers of this volume. In the first place the great majority of mothers breast feed their babies for three months. The milk generally holds out that long even in the mothers who have a poor milk supply. In the second place the feeding of a baby under three months of age is a matter of such skill and varies so much in the individual case that most people are anxious to leave it to skilled baby feeders.

There is some difference of opinion as to whether a baby should have any food in the first twenty-four hours of its life. I think the majority are

of the opinion that it should not. Plain water, unsweetened, is better than sugar water.

During the remainder of the first week Dr. Grulee offers the baby three ounces of a mixture half milk and half water. To a seven-days-old baby weighing eight pounds he gives eighteen ounces of milk and water, half and half, in six feedings. A fourteen-day-old baby weighing eight pounds gets the same mixture with the addition of one-quarter ounce of malt food. A two-months-old baby weighing ten pounds gets milk, twelve ounces; water, ten and one-half ounces; malt food, three-quarters of an ounce, in five feedings of four and one-half ounces each.

FEEDING SICK BABIES

If it were possible to obtain an accurate record of baby sickness it would be found that many babies get sick in June and the early part of July, though the baby death rate does not begin to show much rise until after the middle of the latter month.

The asylums, sanitaria, hospitals, and baby tents find that the children who are severely sick in midsummer give a history of mild sickness in the early summer. It is the old, old story of the "stitch in time saving nine."

Loose bowels, green stools, mucus, and blood cannot be neglected with any degree of safety after June 15 in this climate and June 1 in warmer climates. The child may seem to be happy, not upset by the little indigestion, and it may seem useless to worry about so trifling a matter. But, unless these trifles are attended to, things will get worse as the weather gets hotter and, presently, the baby is in a condition where no food seems to agree with it and no doctor seems to help it. The mother must carry on her long, weary fight to keep the poor, skinny baby alive until the nights get cool in October.

The first thing to do when the baby gets sick is to stop feeding it. Probably the milk is bad anyhow. But, whether it be good or bad, it will disagree with a sick baby. In place of milk the baby should take clean water from a clean bottle or a clean cup. If the trouble keeps up there are milk substitutes which can be given until it is safe to give milk again. The physician or nurse will demonstrate how these are made.

The next step, after stopping the food, is to empty the child's intestines of all fermenting, decomposing food. The parent is justified in going as far in this line as the use of oil by the mouth and of simple enemas by injection. If relief does not come when these have acted the mother is not justified in going further. She should get help from a physician or nurse. Caring for a sick baby is so largely "doing and showing," as contrasted with "telling," that a nurse is needed more than would usually be the case.

As the child goes back on milk let it be watered milk or good buttermilk. If the first feeding agrees, let the next be slightly less watered, and the next still less, until within a few days the diet is one proper for the age and season of the year. Occasionally a mother continues to give watery milk after the acute trouble has subsided and the baby in a few weeks shows signs of starvation.

Remember—a baby with indigestion can be starved by overfeeding. The indigestion passed, it may be starved by underfeeding.

SELECTION OF BABY FOOD

Many thousand women cannot get ice with which to keep the baby's supply of cow's milk. They have no mother's milk. They cannot do the best thing; they cannot do the next best thing; they must choose further down the line.

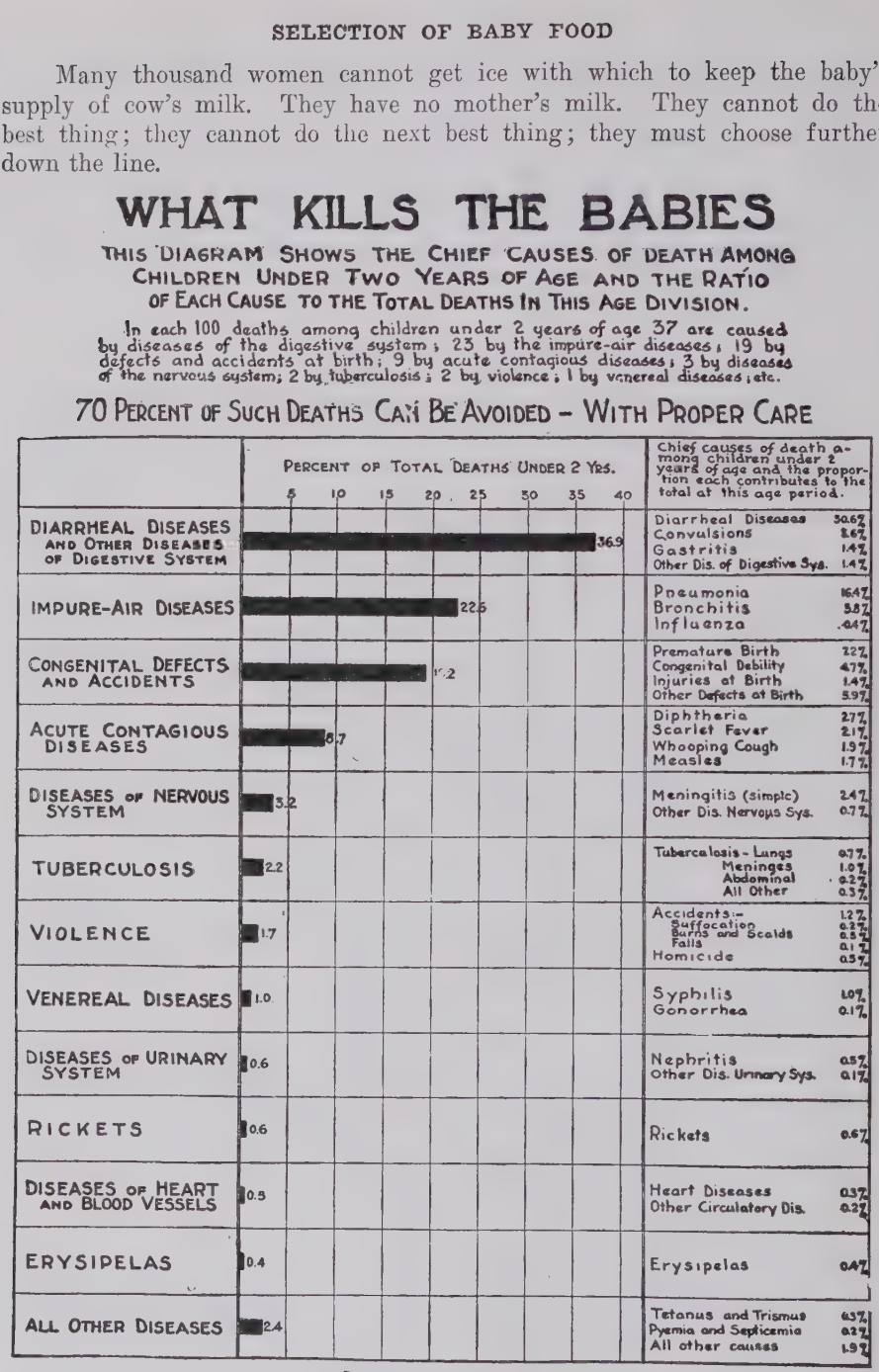

WHAT KILLS THE BABIES
THIS DIAGRAM SHOWS THE CHIEF CAUSES OF DEATH AMONG CHILDREN UNDER TWO YEARS OF AGE AND THE RATIO OF EACH CAUSE TO THE TOTAL DEATHS IN THIS AGE DIVISION.
In each 100 deaths among children under 2 years of age 37 are caused by diseases of the digestive system; 23 by the impure-air diseases; 19 by defects and accidents at birth; 9 by acute contagious diseases; 3 by diseases of the nervous system; 2 by tuberculosis; 2 by violence; 1 by venereal diseases; etc.
70 PERCENT OF SUCH DEATHS CAN BE AVOIDED – WITH PROPER CARE
PERCENT OF TOTAL DEATHS UNDER 2 YRS.
5 10 15 20 25 30 35 40
DIARRHEAL DISEASES AND OTHER DISEASES OF DIGESTIVE SYSTEM
36.9
IMPURE-AIR DISEASES
22.6
CONGENITAL DEFECTS AND ACCIDENTS
17.2
ACUTE CONTAGIOUS DISEASES
8.7
DISEASES OF NERVOUS SYSTEM
3.2
TUBERCULOSIS
2.2
VIOLENCE
1.7
VENEREAL DISEASES
1.0
DISEASES OF URINARY SYSTEM
0.6
RICKETS
0.6
DISEASES OF HEART AND BLOOD VESSELS
0.5
ERYSIPELAS
0.4
ALL OTHER DISEASES
2.4
Chief causes of death among children under 2 years of age and the proportion each contributes to the total at this age period.
Diarrheal Diseases 30.6%
Convulsions 2.6%
Gastritis 1.4%
Other Dis. of Digestive Sys. 1.4%
Pneumonia 16.4%
Bronchitis 5.8%
Influenza .4%
Premature Birth 2.2%
Congenital Debility 4.7%
Injuries at Birth 1.4%
Other Defects at Birth 5.9%
Diphtheria 2.7%
Scarlet Fever 2.1%
Whooping Cough 1.9%
Measles 1.7%
Meningitis (simple) 2.4%
Other Dis. Nervous Sys. 0.7%
Tuberculosis - Lungs 0.7%
Meninges 1.0%
Abdominal 0.2%
All Other 0.3%
Accidents:-
Suffocation 0.2%
Burns and Scalds 0.3%
Falls 0.1%
Homicide 0.3%
Syphilis 1.0%
Gonorrhea 0.1%
Nephritis 0.5%
Other Dis. Urinary Sys. 0.1%
Rickets 0.6%
Heart Diseases 0.3%
Other Circulatory Dis. 0.2%
Erysipelas 0.4%
Tetanus and Trismus 0.3%
Pyemia and Septicemia 0.2%
All other causes 1.9%
DEPARTMENT OF HEALTH, CHICAGO.
Popular Education Series No.5

FIG. 303.

To help this large number of mothers much investigation has been going on in recent years. Conclusions are far from being final, but they are pointing in certain directions.

A baby food must contain milk in some form. The investigations point definitely that way. A recent study of four foods, made by research workers at the University of Illinois, showed this quite well. They fed mice on Horlick's malted milk and Nestlé's food, which contain dried milk, and with two other foods which contain no milk.

They observed the mice, as to whether they kept up their weight, grew properly, and bore young capable in turn of bearing healthy young. Or, to put it another way, they would divide a batch of young mice into two groups. One group was fed on ordinary mixed food, the other on food under test. The members of the two groups were weighed, measured, and closely observed at regular intervals. The number of young and the conditions of the young were noted.

As the second generation approached maturity the test young were divided into two groups. One was fed on the test food, the other on ordinary food. The number and condition of the third generation were counted and observed.

In this way the research workers determined whether the test food produced fat, supported growth, made possible the breeding of sound progeny, with sufficient vitality to grow up and themselves produce sound progeny.

The milk foods stood the test. The foods in the manufacture of which no milk is used did not.

The teaching of this experiment is that where a mother is selecting a food for her nursing baby she should read the label carefully and select one made wholly or partly from milk. This refers to the use of milk in the manufacture of the food. If the food must be mixed with milk at the time of use it has no advantage over the use of milk.

A baby food which is a dry powder will keep better than one that is liquid or nearly so. After a can of evaporated milk is opened it spoils rapidly. It is not safe, therefore, to use evaporated milk unless it can be kept as cool as tap water will keep it. It must be kept clean. After a can of condensed milk is opened it spoils slowly. It must be kept cool and clean. A dry, powdered food is much easier to keep.

MERIT OF BABY FOODS

Most babies get mother's milk until they are eight months old. Many babies are not so fortunate, however. There is a very large group, composed in part of babies under eight months and in part of the older babies, which must depend on cow's milk and other baby foods.

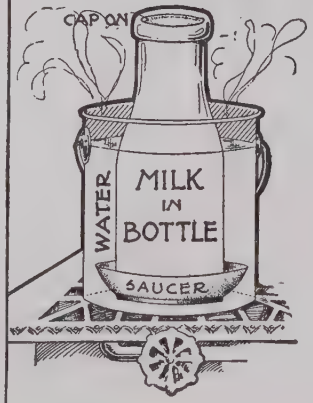
In this group there are two smaller groups that do not thrive on cow's milk. These are: (1) babies who can get nothing but ordinary city raw milk and (2) babies in whose homes there are no facilities for keeping the milk cold. It matters not whether the milk be certified, pasteurized or raw, it will not keep unless it be cold.

Some of these families can be provided with ice. Where ice is not available, then what? Evaporated milk, condensed milk, or some baby food.

MAKE BABY'S MILK SAFE

PASTEURIZE IT AT HOME

THIS KILLS DISEASE-PRODUCING GERMS in MILK



Directions for Pasteurizing

Use a pail a little shorter than the milk bottle.

Place saucer in bottom of pail and stand the bottle of milk on this saucer. Leave cap on bottle.

Pour hot water into pail until water level is about four inches below top of bottle.

Place on stove and bring water to boiling point.

When water begins to boil immediately remove bottle of milk from pail.

Cool the milk in bottle as rapidly as you can and place it in ice-box as soon as possible.

MILK MUST BE KEPT COLD & TIGHTLY COVERED IN CLEAN BOTTLES TO PREVENT DEVELOPMENT of GERMS IN IT.

Chicago Department of Health, Educational Poster No 55 — Designed by: Dr C. St. Clair Drake

FIG. 304.—A HOME PASTEURIZER.

Whenever we study statistics relating to baby welfare we find a disproportionate sickness rate among the babies fed on these foods. But we must remember that these comparisons are between the babies on mother's milk, iced milk, and uniced condensed milk. A fairer study would be between

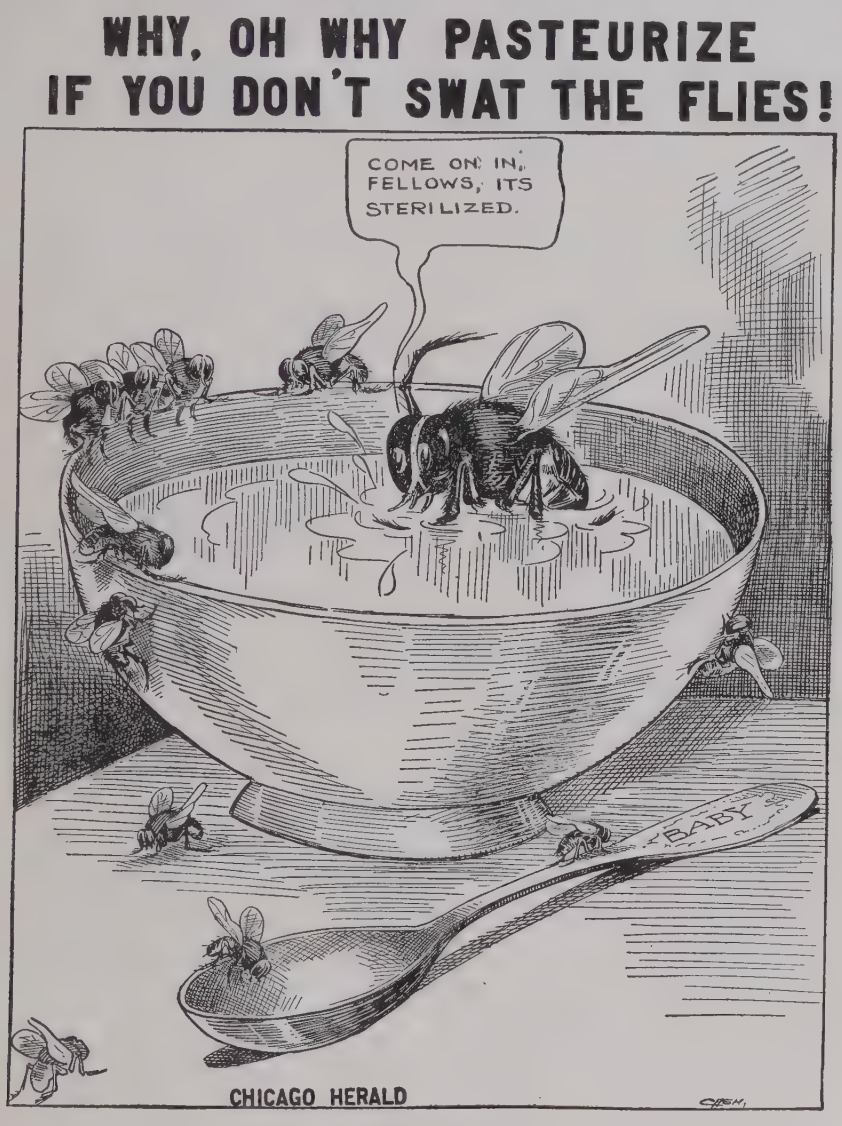


Fig. 305.

babies fed on uniced raw milk and babies fed on uniced condensed milk and uniced baby foods. But no baby doctor would dare feed a baby on raw cow's milk kept uniced. It would be too risky.

It all comes back to this: In those homes where the choice lies between warm milk and baby foods, the lesser evil is the condensed or evaporated

milk and the baby foods. Or to put it differently, if a mother cannot get ice to keep the milk during the hot days she had better give her baby some form of canned food.

As between the two kinds of milk, evaporated or condensed, some will prefer the one, some the other. Condensed milk is evaporated at a low temperature. Not all bacteria are killed. The milk is then preserved by adding to it 40 per cent of its volume of cane sugar. The few feeble bacteria present are restrained by the sugar. Evaporated milk is evaporated at a higher temperature in a vacuum pan. No sugar or other preservative is added. It must be sterile, else it is not marketable.

Soft Spot on Head.—*I. N. O. writes: "How and whence comes the small soft spot on the uppermost part of babies' heads? How long does it take before it is completely hardened? What is its purpose, and is there any danger in injuring or breaking it?"*

Reply.—1. The bones of a child's head begin as ordinary membranes. These membranes begin to be converted into bone at centers. The centers are located near the middle of the patches of membrane. The conversion of membrane into bone proceeds from the middle toward the edge. By the time the child is eighteen months of age the bony plates growing from the different centers have met, been knitted together, and form a solid bony brain box. At the time of birth this change of membrane has not been completed. There are soft areas. The location of the largest of these is known to every parent. The next in size is at the back of the head near where the neck joins it.

2. Usually eighteen months. The range is from fourteen to twenty-four months.

3. The purpose is twofold—to make being born easier and to allow for rapid growth of the head after birth. To perforate the fontanelle is dangerous, of course. However, it is not easily perforated. The membrane is nearly as tough as young bone.

Shape of Baby's Head.—*L. T. H. writes: "Our baby's head seems to be getting flat on the back. Will you please tell us whether it will grow round again, when she sits up? She is six months old and weighs ten pounds, double her weight at birth. She is perfectly well, but does not hold herself up like some larger babies of the same age. Her food is cow's milk and barley water."*

Reply.—The head has a remarkable capacity for righting after being pressed out of shape. Nevertheless, it is easy to shift the baby's position frequently.

She should not sit up for another month. Do not stimulate her to sit up before she is ready. As she started small she may be a little slow in sitting up.

Mouse Story Untrue.—*A. J. writes: "My wife saw a mouse twice on the first day she felt life within her, and the second time she saw it she put her hand to her mouth to prevent an outcry. Do you think that the child is likely to be marked?"*

Reply.—No. Two hundred years ago it was proved that no such effect was possible. Have her forget her worries.

Measurements for Baby.—*Mrs. M. K. writes: "I wish data in regard to perfect baby 2½ years old."*

REPLY.—The following are measurements for an average baby of 32 months:

Weight, 29 pounds; height, 35 inches; circumference of head, 19½ inches; circumference of chest, 20½ inches; circumference of abdomen, 19½ inches.

Watch out for a baby contest in your neighborhood. If you learn of one where the babies are to be marked on a score card, such as that devised by Dr. Clark of Waterloo, enter your baby. You will learn much, and your baby may get a prize.

Broken Tooth.—*Mrs. B. writes: "A baby 18 months old had an accident and broke one of her upper teeth. Should the root be pulled out or will the second teeth push it out?"*

REPLY.—Leave it there. It is needed to hold the dental arch in place. When the time comes the tooth below will dislodge the root unless it has been absorbed in the meantime. The X-ray will show the conditions there if it seems advisable to use it.

Nursing the Baby.—*Mrs. C. G. writes: "1. I have not sufficient milk for my baby (two months old). My health is excellent, and I eat plenty of wholesome food, drink two quarts of milk a day, and plenty of water. My mental condition is good, and I get sufficient rest and exercise. 2. Can you give an opinion on Reed & Carnrick's Soluble Food? I use a little of it every day for the baby. Is cow's milk better?"*

REPLY.—The German experiments show that nearly every mother can be made to give enough milk for her baby. Experiments both with cows and women show that no particular article of food is a milk producer. Observation shows that, among people in fair circumstances, overeating, by producing indigestion, makes against rather than for a full milk supply. The German experiences show that the best results follow attention to details, such as plenty of sleep, freedom from anxiety (for instance, lest they will not give milk enough), regular and proper emptying of the breasts. Are you not worrying that you may not be able to nurse your baby?

2. Modified cow's milk is better. Have you Holt's, or Kilmer's, or Slemons' books on baby feeding?

Let the Baby Sleep.—*Young Mother writes: "Should a baby about three months old be permitted to sleep six or seven hours at night without nursing? Does a combined alcohol and sweet oil rubbing after each night's bath do any good to the child? What rubbing do you recommend, if any?"*

REPLY.—1. Let the baby sleep as long as he will. If he will go seven hours at night between feedings at three months old, by all means allow him to do so.

2. Do not use alcohol and sweet oil. Bathe with water and soap. If there is a tendency to chafe, use a dusting powder, otherwise not.

Good Place for Babies.—*E. L. R. writes: "Will you please let me know what effect, if any, the climate, water, and general conditions of southern California would have on a family, including a year-and-a-half-old baby, moving out there from Chicago?"*

REPLY.—It would be a good place for you. Babies thrive in southern California. The baby death rate in that section is low.

Child Is Cross-Eyed.—*Mrs. B. writes: "About two months ago my two-year-old baby fell down and injured her right optic nerve. Will she outgrow it? I am dreadfully worried about her. I have been bathing her eyes frequently, and put a piece of black sticking plaster at the side of the eye, hoping the color would help attract the eye toward its proper position again."*

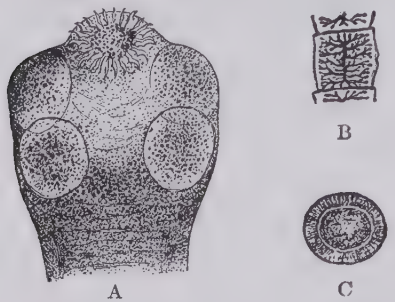


FIG. 306.—TAPE WORM. A, MAGNIFIED HEAD; B, SEGMENTS; C, EGG.

REPLY.—The optic nerve runs from the brain to the back of the eyeball. It is so deeply placed that falls do not hurt it. You need not feel ashamed of your mistake, since the myriad-minded Kipling made the same mistake in his novel, "The Light That Failed."

I judge your baby is cross-eyed. If so, it is because the muscle which turns the eye toward the nose is too strong for the one which turns it toward the cheek. Bathing will not help. Sticking plaster will not help. Have the child play in the open air and the trouble may get right by itself. If not, glasses may correct it. If not, a simple operation will.

Cause of Worms.—*Mrs. H. A. writes: "What is the cause of worms in children? What is the best way to get rid of them? What do you think of Pape's diapepsin for indigestion? Is it harmful when used regularly?"*

REPLY.—1. Worms hatch from worm eggs. The eggs are swallowed. One child with worms is liable to infect a group.

2. For round worms nothing is more effective than santonin powders (two to five grains). Ordinary worm medicine is effective. Other kinds of worms require other treatment.

3. Let it alone.

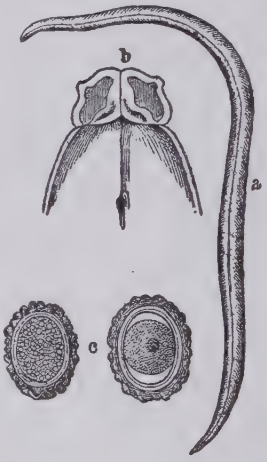


FIG. 307.—ROUND WORM GREATLY MAGNIFIED. *a*, worm; *b*, head; *c*, eggs.

May Do Baby Harm.—*Mrs. P. M. is giving her one-month-old baby three-quarters of a grain of saccharin a day. Is it wise? Is the passing of undigested food by a baby reason for alarm?*

REPLY.—1. The government experts have reported adversely to saccharin. There is a good deal of literature published in the last few years on the harm done by milk sugar in baby feeding. I can see no reason why you should give your baby saccharin, and I can see where it might do harm.

2. Undigested food is not of great consequence if the baby is gaining in weight and is comfortable. Nevertheless, in raising a bottle-fed baby it is wise to take counsel with your physician periodically.

Left-Handed Baby.—*R. H. D. writes: "Our baby boy, five months old, uses his left hand a great deal in picking up his toys. Is there any way to prevent him from becoming left-handed?"*

REPLY.—It depends on the way the brain cells are hooked up. Inheritance is a factor in it. You can train a child to use his right hand by keeping a mitt on the left. This must be persisted in to be successful. When persisted in it generally results in ambidexterity, which is highly desirable.

Let Baby Sleep Out of Doors.—*C. C. K. writes: "My baby was born in May and has been out of doors every day during the summer and fall, except when it has rained. Is it advisable to let him have his daily nap out of doors during the winter?"*

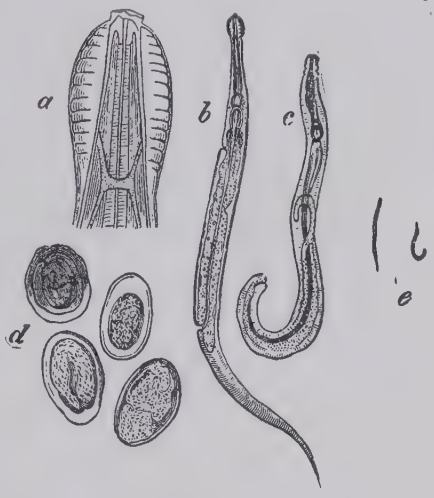


FIG. 308.—PINWORMS: a, head; b, female; c, male; d, eggs; e, pinworms, natural size.

REPLY.—It is. Babies six months old are good heat makers and should have lots of exposure to cold. The ability to catch cold from exposure to cold, from cold feet, wet feet, et cetera, is acquired as the result of coddling. It is frequently found in adults. It is seldom found in babies. It, of itself, is an abnormality.

Not Robbed of Vitality.—*X. Y. Z. writes: "Kindly inform me if it is in any way harmful for an infant or young child to sleep with a healthy and clean grandmother?"*

REPLY.—Sometimes grown people roll on infants. Many deaths are caused in this way. Babies are liable to catch colds from adult bedfellows, even though the adults are not sick themselves. These are about the only objections. Weigh them in your case as against the advantages in a domestic way. The idea that the baby is robbed of magnetism, or electricity, or vitality has no foundation in fact.

Avoid Use of Drugs.—*Mrs. B. R. writes: "My baby, one year old, is troubled with constipation. We have used maltine with cascara sagrada for him. He does not seem to be improving. For breakfast I generally give him a cereal and for other meals he has cream on bread and sometimes a white sauce on bread. What do you advise me to do about him?"*

REPLY.—Do not give the baby cascara sagrada or any other drug habitually. A one-year-old baby should be able to take enough water, fruit juice, and oatmeal gruel to relieve constipation. Dilute the milk more. Give more oatmeal gruel; give more water, more orange juice, prune juice, or scraped apple. If something must be used, use enemas and soap sticks.

Baby with the Colic.—*Young Mother writes: "Kindly tell me what to do for my baby for colic. He is now three weeks old, and has colic some time of every day and night."*

REPLY.—Your milk is probably too rich in solids. Give the baby some water just before it nurses. You should eat less food and exercise more. If the condition does not improve, you had better have your doctor help you to work it out.

Dandruff on Baby's Head.—*J. M. writes: "What can I do for scaly dandruff on three-months-old baby's head? Have used olive oil and white vaselin with no avail."*

REPLY.—To keep the baby's scalp oiled and cleaned helps, but it does not go to the root of the trouble. A baby with head eczema needs a change in its diet. Generally the food is too rich. The only treatment which avails is to change the feeding and overcome constipation, and even that sometimes gives results slowly.

Baby's Second Summer.—*H. J. M. writes: "I notice reference in your column to a baby's second summer being a hazardous period. Is it any more so than any other summer, and, if so, why? Would you recommend any special food?"*

REPLY.—It is especially difficult to hold a child to a simple diet during the second summer. During the second summer a child should have five meals between seven in the morning and seven in the evening. The diet lists should be made up from milk, dry toast, crackers, cereal, rice, eggs, a little meat, orange juice and other fruit juices, butter, soups, and a few vegetables, such as spinach, asparagus, new peas and potatoes.

Feeding the Baby.—*Mother writes: "1. Should I feed my eight-months-old baby anything aside from breast milk? 2. Are Graham crackers good? 3. (a) Will it hurt this baby to cry itself to sleep at night? (b) As this seems the only method, how long should I let the baby cry? 4. How can I break the baby from nursing three or four times a night? 5. Is water out of the faucet all right for the baby to drink? 6. How many teeth should a baby eight months old have? 7. Does it hurt this baby to stand on its feet, as it insists upon doing?"*

REPLY.—1. If the baby is thriving do not feed anything beside breast milk. If the baby is not growing or is hungry a good part of the time, dilute cow's milk and add it to the feedings. Many mothers give milk enough when baby is eight months old; some do not.

2. They will be good when the baby is a little older.

3. (a) No. (b) Until it goes to sleep.

4. Give some water, but no food, at the old times. If the baby has been nursing every two hours during the night run for awhile on a four-hour interval. At the end of two months it can be made to go without food for six to eight hours at night. Evidently you began to train your baby wrong. To teach proper sleeping and eating methods will be more troublesome now than it would have been at the beginning, but it will be less trouble now than if you put it off longer.

5. Yes.

6. One to four.

7. If the baby is healthy and strong it will not, provided it tries to stand as it wants, not as the parent wants.

Baby Improperly Fed.—*Mrs. T. C. writes that her baby is a year old, weighs thirty pounds and has six teeth. Lately the baby has been vomiting a good deal. She gets oatmeal and milk in equal quantities (amounts not stated). The baby pulls at the mother's breasts, but there is not much milk—at least the mother thinks not. She is five months pregnant. She asks:*

1. Is the baby's indigestion due to teething?

2. Is the food right?

3. Does allowing the baby to nurse hurt the unborn babe?

REPLY.—1. Indigestion is not due to teething. Indigestion is due to faulty feeding.

2. You are overfeeding—especially starch. Your baby is too large for good health. She will be certain to get in serious trouble when hot weather comes unless you decrease the amount of starchy food.

3. If you keep well nourished and strong it will do the new baby no harm. If you are not, it will. Remember you are feeding yourself, your unborn babe, and your one-year old. If you are equal to it, as shown by your own condition, keep it up. If you are thin or run down, tire easily, cut off the only one you can—the one-year old.

When the Milk Fails.—*Mrs. H. E. C. writes that she has a boy four months old. Her milk has failed. She gave boiled milk, and the baby became constipated. The baby is nervous.*

REPLY.—When mother's milk fails, the best food is fresh cow's milk. This should be either certified or pasteurized. It should be diluted according to the age of the child.

It is not a bad idea to use malted milk, condensed milk, and baby foods during the hot weather. Particularly is this true if you are not certain that your cow's milk is clean, cold, and fresh. But such foods are not well enough balanced for feeding continued over a long time.

The constipation should be corrected by orange juice, two or three tablespoonfuls a day. Water should be given.

Do Not Boil It.—*Mrs. S. B. writes: "Should one boil certified milk for a baby five to six months old? At what age can a baby sit up in a high chair?"*

REPLY.—1. If you are certain the certifying is not a fake, do not heat the milk at all. If you are not certain, pasteurize it, but do not boil it.

2. Seven months.

More Fruit for Baby.—*F. G. T. writes: "My baby, 17 months old, is troubled with constipation. I feed him soft boiled egg, Graham crackers, oatmeal, bread, orange and prune juice, and milk. He drinks one quart of milk a day. Can you advise as to any change in his diet to overcome this? Otherwise he has always been healthy, and is growing splendidly."*

REPLY.—Make no radical changes. Give him water several times a day. Try a baked apple. Give more fruit, beef juice, meat and bread. You may have to give him less milk to get him to eat more of the bulkier foods.

Mother's Milk.—*R. T. R. writes: "I am a mother of a baby three and one-half months old. My supply of milk is scant. I would like to know what the simple things are to make milk."*

REPLY.—First, freedom from worry and anxiety, above all, fear that the milk will dry up. Second, regular sleep and plenty of rest. Third, plenty of plain, wholesome, nutritious food. No one kind of food is materially better than any other. Fourth, regular nursing at intervals of less than six hours.

Feed Baby Now.—*Anxious writes: "I have a baby girl sixteen months old. I fully intended weaning her at the year, but friends advised not to do so until she had her stomach teeth. Thinking she would have them before the warm weather came, I kept on nursing her. As she hasn't got them yet, I am at a loss to know whether I should wean her or nurse her through the summer. She has the four upper and lower, also her three double teeth, and the fourth is just about through. She has had no trouble with her teething, and she has been well ever since she came."*

REPLY.—She will be twenty-two months old by cold weather. You will hardly have milk that long. You had therefore better start feeding her now.

Feeds Baby Too Much.—*H. C. writes: "My baby weighed eight pounds at birth. He weighs thirteen pounds at four months. Per gleanings from your 'How to Keep Well' articles, I am supplementing the breast by three ounces of Horlick's malted milk, a teaspoonful at a time. The baby has eczema on face and scalp in three places that do not yield to Cuticura. Could he be fed beef broth to supplement?"*

REPLY.—You are feeding too much. The gain in weight and the eczema both prove it. The baby is too young to be taking so much carbohydrates. Why supplement with anything? If necessary to use anything give one cow's milk feeding properly diluted.

Weaning the Baby.—*Mrs. H. writes: "My baby boy is eight and one-half months old and I nurse him. Now I find myself pregnant again. 1. Is it necessary for me to wean baby? 2. If so, what shall I feed him?"*

REPLY.—1. Decide this question by whether the baby is thriving or not and whether you keep in good condition. You probably will have to wean him before cool weather anyhow, and you might as well start now.

2. Diluted pasteurized milk.

Nothing to Do with the Moon.—*Mrs. F. K. writes: "I wish it might be possible if you see fit to have an article on 'Weaning a baby by the sign of the moon,' as I know from my experience there is everything in it. I weaned my baby the seventh of September and never had one bit of trouble. A friend weaned hers the week after, and the poor little thing cried for a day and night."*

REPLY.—There is nothing in it. The moon is not mixing up with babies and babies are not mixing up with the moon. The mother who is weaning her baby should watch the baby closely and let the moon go hang, for a baby whose food and habits are being radically changed needs close attention.

Conclusions drawn from one or two experiences are usually misleading. Why one of these babies did well and the other poorly I do not know.

Maybe one naturally had a better digestion than the other. Maybe one got cleaner, fresher cow's milk than the other. Maybe one was more intelligently handled than the other.

The apparent relation to the moon was coincidence rather than cause and effect. It is not the first time, by long odds, that coincidence has been confused with cause. We should always be careful not to draw conclusions from too few observations. It makes trouble for us.

January Good Weaning Time.—*Mrs. C. R. F. writes: "I wish to wean my 9½-months-old boy, who is in the best of health, and would thank you to advise me what food would be best for him and whether he should be fed at regular intervals or whenever he is hungry."*

REPLY.—January is a good weaning time, though 9½ months is a little early. Use 13 ounces of milk, ½ ounce milk sugar, 1 ounce lime water, 6 ounces gruel. Give orange or prune juice every day. Feed at regular intervals of four hours. Do not feed from 10 o'clock P. M. to 6 o'clock A. M. If he does not thrive, get medical counsel.

Bowlegs in Babies.—*Mrs. E. G. H. writes: "Would you kindly inform me if there is a cure for bowleggedness in a child of two years? What causes it? Will it correct itself if left alone, or would you advise braces?"*

REPLY.—Bowlegs result from putting weight on legs the bones of which are not yet firm enough. The weight and the pull of the muscles cause the legs to bow out, bowlegs, or bend in, knock knees. Why are the bones too soft? Because of rickets. A mother who notices that her baby sweats around the head, does not hold his head up well, does not sit up straight as children do at his age, should suspect rickets. If his head is overlarge, or his legs are not developing well, or his teeth are much delayed, she should strongly suspect this condition.

Rickets should always be discovered and cured before the legs begin to bow. If the legs have bowed, can anything be done? Yes. The food must be richer. Cream and butter should be added. Meat and vegetables must be given. It is well to feed the milk raw. Cod liver oil can be given whenever enough milk and butter cannot be taken. Life in the open air is essential. The child should be kept off his feet as much as possible until the rickets has been remedied.

A certain amount of bowing of the legs tends to remedy itself when the rickety condition is remedied. The bones of children are not completely ossified and the tendency of the muscles is to pull a slightly bowed bone to its normal shape. If the deformity is bad, nothing but operation will cure. I do not think braces will help.

Baby Carriages.—*H. S. B. writes: "In a discussion regarding baby carriages for children under two years of age, an agreed opinion could not be reached in regard to the so-called baskets. It was the opinion of several that the construction was such as to cause permanent injury for the reason that it did not have the proper springs to prevent jarring. 1. In view of your valuable advice in regard to babies, I will appreciate it if you will give me your opinion on this point. 2. Also, what is the proper quantity of certified milk for one feeding where a six-months-old child is fed every four hours?"*

REPLY.—1. Will not cause permanent injury.

2. An average baby six months old should be fed in twenty-four hours thirty-three to forty-two ounces of prepared milk containing eleven ounces of whole milk. This should be divided among the feedings.

Cause of Sty.—*H. M. writes: "Will you please reply to the following questions?*

"Our baby, eight months old, seems in perfect health and weighs seventeen and a half pounds, but she has already had three sties, or gatherings, on her eyelids and is getting a fourth. Can you tell me the cause of them and how I can prevent their coming? What is the best thing to do after they have started to gather?"

REPLY.—Keep the eyelids very clean by washing them in a saturated solution of boracic acid. A sty is due to bacteria infecting the lid after traveling from the surface down the lash. Therefore, sometimes a sty can be absorbed by pulling out the lash or lashes whose roots are infected. Other than that, the child's nutrition is probably out of balance. Probably she is being overfed. When bacteria travel down hairs, there is usually some such constitutional reason.

No Remedy Known.—*W. L. D. writes: "My boy, aged three, grits his teeth at night dreadfully; in fact he wakes me up every night, sometimes several times. He eats only what a child of his age should, and for supper he gets only milk or some cereal. How am I to stop the habit? I am afraid he will hurt his teeth, for he grinds them together with an awful force and can be heard in any of the adjoining rooms."*

REPLY.—If I could help you I would. Many letters asking for help along this line come to this department.

I have not read or heard of anything promising.

Break Lad of Habit.—*Worried Mother writes: "Is thumb sucking a bad habit? My boy is nearly five years old, and has sucked his thumb since babyhood. It seems impossible to break him of the habit. Does it enlarge the adenoids? When not sucking the thumb his mouth is open most of the time, which gives him almost a dumb expression."*

REPLY.—Your letter answers itself. Your child keeps his mouth open most of the time and has almost a dumb expression. Break him of the habit, or break a leg, else he will break your heart.

CHAPTER XLV

Children

WHY IS YOUR CHILD "IT"?

Of the backward children Dr. L. B. Ayres of the Russell Sage Foundation says: "We know them in school as the children who are always a little behind physically, a little behind intellectually, and a little behind in the power to do. Such a child is the one who is always 'it' in the competitive games of childhood."

He further says that when a child fails to keep up in work, study or play he is being educated to consider himself not the equal of his fellows; finally he becomes thoroughly trained in failure and is destined to a life of failure. Even if Thomas Jefferson's fine phrases in the Declaration of Independence that "all men are created equal" were true a few years on the playground and in the schoolroom would make them unequal.

When a child is the "it" of a group there's a reason. It may be that the cause cannot be remedied. If it can be remedied it should be. What of the parent who permits his child to train for failure because of some cause that can be remedied? What of the school board which permits it? or the school teacher?

One of the causes is poor vision. One group of investigators has examined the eyes of backward children. Another group has investigated the school standing of children with eye defects. The conclusions of the two groups are in a general way the same. The conclusion of each group sustains the conclusion of the other. *A very large proportion of the backward children have poor vision. A very large proportion of the children with poor vision are backward.*

Tens of thousands of children have been investigated. The investigations have been made in Europe and in many parts of the United States. Some of the investigators were eye specialists, some school teachers in ordinary everyday schools, and some were associated with reform schools. There is no possibility that by any accident the cases were not typical. We can be certain that the proportions found are about the proportions existing in the schools of our town.

Dr. Shaw said before the last International Congress on School Hygiene [1913] that in his experience 66 per cent of the backward children who were not subnormal mentally had ocular defects. Some were nearsighted, some farsighted, some astigmatic and some had cross eyes. When the eyes were properly cared for the children ceased to train for failure. They ceased to be the "its."

He made a special plea that something be done for the cross-eyed children.

Most people believe that children outgrow cross eyes. They do not. Behind the cross eyes is trouble with the vision. Generally cross-eyed children are farsighted. In their straining to see in spite of their infirmity the eyes are pulled out of line, sometimes one, sometimes both.

Generally the eye which is most farsighted is pulled in. As that eye looks in one direction it forms one picture. The eye looking forward forms another. The cross-eyed person endeavors to see two pictures at once. But however capable the two eyes may be of seeing two pictures at the same time the brain can register only one.

In the early days of cross eyes there is a struggle between these two pictures for supremacy in the brain register. Confusion results—vision confusion and then brain confusion. A way out must be found. The way is blindness in the crossed eye. A cross-eyed man sees with the eye that is looking at the object his mind is on. What the other eye sees the man does not see. The result is that the crossed eye passes from usefulness through incapacity into degeneration.

Dr. Shaw thinks cross eyes should be discovered when they first begin to cross. To do this properly every child should have an examination of the eyes before starting the first grade followed by occasional examinations throughout school life.

When there are no school physicians the teacher can catch many cases of squint in the very early stage by following a simple test. The pupil looks intently at a sentence on the blackboard twenty feet away. The teacher covers first one and then the other of the student's eyes. When the hand is suddenly removed from in front of a badly defective eye it will be noticed that the eye is slightly crossed and that it will quickly jump back into line. Such children should go to the eye specialist for a more careful examination.

Aside from the use of this method the teacher is in a very good position to judge of the sight of the student. Dr. Baker even went so far as to say "the teachers are in a better position to diagnose eye strain than the inspector or nurse, not from the fact that the child cannot read the test card but from the symptoms shown in the classroom during the usual period of school hours."

As one can infer from the above statement by Dr. Baker there are simple test cards available everywhere by the use of which a teacher can form a fair idea of the vision. In addition to using these an observant teacher can strongly suspect eye strain from such signs as frequent sties, redness of the lids, excess of tears, intolerance of light, squinting, habitual blinking, wrinkling of the brows, "crow's feet" at the outer side of the eyes, holding the head sideways, bending over the work or frequent shifting of position.

Dr. Shaw told of a boy whom one teacher reported spending the long school hours practically unemployed, twisting and turning about on his seat and making strange grimaces. The trouble with the boy was that he had opacities on his cornea. "Sitting through the school session without any intelligent idea of what was going on about him, the child was simply amusing himself getting glimpses of the light which streamed into the room from the various windows."

Dr. Fulkerson studied the proportion of children having poor vision among a lot of backward children. He found that 53 per cent of them were

deficient because their sight was bad. By remedying the defects the children were able to train away from failure. He quoted others as having found from 42 to 45 per cent of such children with eye defects.

Wessels says 25 per cent of school children have defective sight. The percentage of children with defective sight among the backward is more than double that among all children. He says that it costs $35 a year to teach each pupil. It costs $280 to carry each pupil to the eighth grade. If by reason of poor vision the child is backward it costs the community $280 to carry him to the fourth.

On the basis of 7,814 children examined in a Philadelphia series Wessels figures a composite loss of $414,685. The extra expense to which Philadelphia is put to educate backward children of poor vision he places at $87,000 a year.

The reports from those who are in charge of reformatories and prisons show that the proportion of those with poor sight is even larger. Dr. Case found that of 400 boys in the Elmira reformatory 223 needed glasses in order to do near work without suffering. In the New Jersey reformatory 83 per cent of the boys need to wear glasses. Dr. William Richards said:

"Some time ago I became impressed with the idea that the criminals I knew also were the most incompetent people I knew, and thought there might be some relation between these two facts. I therefore made a physical examination of a good many criminals and found that they were all of them suffering from some form of physical defect."

William Evers, formerly guard on "murderers' row" in the Tombs, is quoted by Dr. Richards as follows:

"I have been dealing with criminals for twenty-nine years; perhaps I have seen more murderers than any man in the United States, possibly in the world, and I have never seen a criminal who did not have some physical defect which in my opinion was the cause of his being where he was."

Stimulated by his experience with criminals in the prisons in New York state and convinced that he was working at the wrong end of the line, Dr. Richards and his associates for several years have been successfully handling groups of incorrigibles in the New York school by attending to their physical defects and especially their visual defects.

The children cared for fell into three groups.

1. The ungraded, or those too backward for regular classes. This group formed half the total.

2. Backward children who had to take more than one term to a grade.

3. Delinquent children, truants, and those who kicked and bit and screamed every now and then and with whom nothing could be done in a disciplinary way.

A great many people not especially interested in child welfare will be interested in one general position taken by Dr. Richards—that there are a few great causes of disease which can be grouped under two general heads, "faults of habit" and "faults of structure." These make a favorable soil for the exciting causes of disease to act upon.

Dr. Wessels investigated the proportion of backward children among those with poor vision. In his Philadelphia city hall clinic he examined 9,167 school children. He found faulty vision in 7,319. The examinations

were carefully made after the eyes had been prepared by the use of drops. Of the 7,319 children with poor vision he found upon investigation that 5,211, or 72 per cent, were backward. The proportion of backward children increased as the age of the children increased. Only 29 per cent of the 8 year old children were backward. Of the 14 year old children with poor sight 95 per cent were backward.

Professor Dufour laid down the following rules:

1. In all schools the number of shortsighted pupils increases from class to class.

2. The average degree of shortsightedness increases from class to class.

3. The number of shortsighted pupils increases with the increase in the school demands.

In other words, school work is a strain on the eyes. The longer it lasts the more eyes give way under it, and the greater the degree of giving way and the harder the work, the greater the number of eyes which give way.

Dr. Cohn found that in the Breslau schools 6.7 per cent of the children in the elementary schools were nearsighted; in the academy grade, 19.7 per cent; in the university, 59.5 per cent.

Dr. Rislay found in the Philadelphia schools that 4.27 per cent of the lower grade children were nearsighted. The percentage for the academy grades was 19.33. Drs. Posey and McKenzie reported that 19.75 per cent of the students in the University of Pennsylvania were nearsighted.

Dr. Parke Lewis advocated changing the educational method where it was evident that the eye was going down under the strain. Some of these cases can be adequately cared for by properly fitted glasses. Some can be relieved by changing the light or the position of the desk or some other detail. However, there remain cases in which the eye strain is too great in spite of what is done. For these Dr. Lewis suggests that there be less reading and more instruction by other means.

Rousseau wrote: "The child who reads does not think; he does nothing but read; he gets no instruction; he learns words." With a good part of this Dr. Lewis agrees. When a child reads he first gets the words from the printed page. He then forms a mental image of the thoughts contained in the words.

Dr. Lewis says this is a roundabout process. The mind may stop midway of the process, whereupon the printed words mean nothing. To show a child an orange, to permit him to handle it as he is told about oranges, is a better pedagogic method. By teaching the science through the art we teach better and we spare the eyes.

Returning to the starting point, the "it" child is being trained to timidity, self-effacement, lack of courage and an acceptance of inequality. A very large proportion of the backward children can be made normally capable. A very large part of the trouble is due to poor sight. The figures show that children with poor eyes are backward and also that backward children have poor eyes.

Many of the sight defects can be corrected by the use of glasses or by changing the lighting. By modification of the methods of instruction it is possible to spare the eyes.

EVIDENCE OF NORMALITY

A child of three years of age should be able to:

1. Touch his nose, eyes, mouth, and pictures of these when directed.
2. Repeat easy sentences of six syllables with no error.
3. Enumerate familiar objects in pictures.
4. Give family name.

Four years:

1. Know own sex.
2. Recognize key, knife, penny.
3. Repeat three numerals in order when heard once.
4. Rearrange a rectangular card cut differing by half an inch.

Five years:

1. Discriminate weights of 45 grains and 180 grains.
2. Draw after copy a square that can be recognized as such.
3. Count four pennies.
4. Rearrange a rectangular card cut diagonally into two triangles.

Six years:

1. Know whether it is forenoon or afternoon.
2. Define in terms of use the words fork, table, chair, horse, mamma.
3. Perform three commissions given simultaneously.
4. Distinguish pretty from distinctly ugly or deformed faces in pictures.

Seven years:

1. Describe pictures shown him.
2. Note omission of eyes, nose, mouth, or arms from four pictures.
3. Draw diamond shape from copy so that it can be recognized.
4. Pick out red, green, blue, yellow.

Eight years:

1. State difference between paper and cloth, butterfly and fly, wood and glass in two minutes. Two satisfactorily.
2. Count from twenty-one to one in twenty seconds without more than one error.
3. Name days of week in order in ten seconds.
4. Count value of six stamps, three ones and three twos, in less than fifteen seconds.

Nine years:

1. Give correct change from 20 cents (two dimes) paid for an article costing 4 cents.
2. Name the day, month, day of month, year, allowing error of three days either way on day of month.
3. Name the months in order, allowing one omission or inversion in fifteen seconds.

4. Arrange in order of weight boxes of same size weighing 90, 180, 225, and 270 grains in three minutes. Two out of three trials.

Ten years:

1. Name a penny, nickel, dime, quarter, half dollar, two, five, and ten dollar bills in forty seconds.
2. Copy design after ten seconds' exposure.
3. Tell what one should do in various emergencies and answer difficult questions.
4. Use three given words in two sentences.

Eleven years:

1. Detect nonsense in three out of five statements in about two minutes.
2. Name three words that rhyme with obey in one minute.
3. Use three given words in one sentence.
4. Rearrange shuffled words of eight word sentences, two out of three with one minute for each.

Fifteen years:

1. Imagine clock hands interchanged for hour 6:20 and for hour 2:56, telling the time.
2. Write correctly the opposite of seventeen out of twenty-seven words.

TRAINING THE CHILD

One of the first, if not the first, score cards devised to value scientifically the physical charms of the contestants in baby shows was worked out by the Drs. Clark of Waterloo, Ia. Judging the entries in a baby show by this method has just about displaced the old hair pulling, jealousy exciting method, or lack of method, formerly employed.

Now the Drs. Clark are out with a plan for the orderly training of babies. In their opinion lying, stealing, prostitution, cruelty and destructiveness develop upon idleness, disorderliness, and selfishness which in turn result from bad training during the first sixty months of life. They propose that the character qualifications and mentality of every child over eighteen months of age be tested not less often than once every three months.

For the purpose of valuing these qualities in children and teachers they have devised two score cards. One is for children between eighteen and forty-eight months of age. The other is for children over four years and for adults.

The score card for young children contains four points:

1. Expression of the face and eyes, nervous stability, control of the emotions.
2. Helpfulness to family.
3. Readiness to care for self.
4. Self-control as to eating.

The score card for older children and for adults covers the four points covered in the first card and six new points besides. A well trained, normal child should score 85 on the score card.

Accompanying the score cards are schedules of games arranged according to ages. At nine months the child should "pat-a-cake" and find his own teeth and tongue; at eighteen months he should help clear off the table and paste paper to form squares and crosses; at twenty-four months he should string beads, select the colors of beads with accuracy and voluntarily pick up broken beads and put them into waste baskets; at thirty-six months he should brush his teeth, build houses with blocks, cut out and paste pictures and draw crude pictures of houses.

The teaching of a child should be through play. In the training of a child no use should be made of commanding, imploring, threatening or buying as a means of securing obedience. They are even more pernicious than when used with adults.

"Don't" should not be used until all other methods of accomplishing a purpose have been exhausted. Generally a child bent on mischief can be diverted by engaging his attention with some helpful or at least harmless act of greater interest to him. The Drs. Clark define mischief as a small crime.

In the main a child can be taught anything desired by encouraging him to imitate his parents, his teachers and his companions. Orderliness, cleanliness and industry can be taught by providing toy brooms, dust brushes and cloths and permitting the child to imitate the work of putting the house in order.

FIVE CHILDREN DEAD

At least once every day I receive some letter intended for the health commissioner of Chicago. I have just read one such. It is a birth report. A midwife reports the birth of a girl baby with the name R. S., let us say. From the certificate as it lies before me I gather the following information:

The father, Henry S., is a workingman, forty-four years of age. As his employment is one that is unionized it is fair to assume that he belongs to a union. This means that he gets wages that are at least fair. He is not trying to maintain his family on the wages paid to unskilled laborers. They live in a part of town where the residences are two story frame cottages set on ordinary city lots.

His wife, Mary S., is thirty-nine years of age. This is the twelfth child born to Mr. and Mrs. S. Of these seven are living and five are dead. The certificate does not give the ages of these children but they are necessarily young. Probably the oldest is less than twenty years of age and perhaps two or three are under five. It is a safe guess that of the twelve less than half will reach fourteen years of age.

It is not fair to a hard working woman that she should bear twelve children and lose half of them at ages when they are still dependent on her. Thirty-nine years old, twelve children! Ever since she put on long dresses she has been caring for babies. Most of the time she has been bearing one and caring for another and more often two. Outside of her children precious little time has Mary had for any pleasure except pleasure in her children. To the mother who loses more than half of her babies in babyhood pleasure in her children is mixed with pain.

Is it necessary that half of the babies of the Marys should die? There are places where the Marys raise eleven out of their family of twelve babies. Right here in town with Mary, not five miles away from her, there are Marys who have raised some nine and some even ten of their twelve children. Then why not Mary?

She has been very busy. Probably she has never heard of the way those more fortunate mothers have preserved the health of their children. Nobody went to her with that information and she did not have time to go out in search of it. The only people to tell her how were neighbors who had lost their six or ten babies.

Maybe her babies had to live on dirty milk. Mary got the best she could but the best was not good enough to save her babies. Maybe her house was small, and she had to wash and cook in the room where the baby slept.

Whatever the cause, is it fair to have Mary bear twelve children and lose half of them in babyhood?

WHAT THE MOTHER OF A CRIPPLED CHILD OUGHT TO KNOW

It is estimated that there are over 200,000 crippled children in the United States. To the mother of a crippled child this statement means that there are hospitals and schools for the proper care of such children. Of these 80,000 are crippled as the result of tuberculosis.

Tuberculosis in bones and joints results in the main from eating food containing tubercle bacilli. The food which spreads more tuberculosis than all other foods combined is milk from tubercular cows.

The mother of a crippled child should know how she may protect the other children in the family as well as the one that has been and perhaps is still being infected.

She should know that the pain in tubercular disease of bones and joints is usually felt in some portion of the body remote from the diseased area. For instance, a persisting pain in the pit of the stomach in a child who holds his back stiff and who cries when jolted is apt to mean tuberculosis of the spine. A child with a persisting pain in the knee is apt to be suffering from hip joint disease.

The mother of a child crippled from tuberculosis of the bones and joints should know that a great deal can be accomplished by treatment. The disease can be arrested. By discovering the disease early a great deal of the deformity can be prevented.

In a certain sense the responsibility for early diagnosis is up to the doctor. But how is the doctor to diagnose it early unless the parents first get suspicious and have the symptoms investigated? To a limited extent the deformities which follow the acute stages of the disease can be repaired. In some cases it is possible to insert new bone in place of the lost bones. Stiffened joints can be made movable again. Surgery offers much to some of the cases in this group. It is important that the mother know that crippled children frequently suffer from neglect—neglect of which the parents do not know.

The disease is in a bone or a joint. The muscles are sound, but they

are liable to shrink from disuse. It is important that the muscles be kept in good health during the acute stages of the disease. This can be done by rubbing and manipulating, by passive exercise, massage, and electricity.

When the acute symptoms have subsided, the bones or joints have healed and the child can get around, the mother should stimulate the child to play. Play keeps the muscles healthy and the joints movable.

It renders another service which is just as valuable. It keeps the child in touch with other children, develops his mind, and prevents him from becoming sensitive and morbid.

Sugar Good for Children.—*A. B. C. writes: "How about sugar for children? Is its moderate use (accent on moderate, please) advisable? My boys, ages 9 and 10, like it on their oatmeal of a morning. Some pronounce that 'combination' harmful. They say it conduces to colds, etc."*

REPLY.—Sugar is an excellent food for children. It is burned into energy and children use that commodity by the wholesale. There is much danger of their overdoing it. When they are first allowed candy and sweets without stint they overdo, but after a short while they become satiated. A good part of the overdesire for sweets is due to an undersupply. Desire shrinks a little when we know we can get what we want. There are some exceptions. I should say let the children have plenty of sugar on their oatmeal.

Candy Good for Children.—*W. O. writes: "1. When a person has a 'sweet tooth,' that is, takes lots of sugar in both drink and food, has that a tendency to produce bad effects (blood turning into sugar, etc.) later in life? 2. Children as a rule are great for sugar and sweets. Is it good or bad for them?"*

REPLY.—1. Yes. Eating of sugar and starches carried beyond the burning power of the system causes one form of what is called diabetes. However, it is the mildest form and easiest kept under control. It affects grown people.

2. Children should have all the sugar and sweets they want. It is a good idea to keep clean, wholesome and especially home made, candy where the children can take it whenever they want it. Candy is a good heat maker and a fine energy producer.

Bad for Child.—*Mrs. B. writes: "Kindly inform me what the effect of continued crying is on a young child? We have been letting our baby girl cry herself to sleep since birth, and, while no evil consequences have been observed, we have wondered if such a practice would not have a harmful effect on the child's nervous system in time."*

REPLY.—Ordinarily a week is long enough to establish the habit of going to sleep without rocking. If your child cries herself to sleep after months of effort properly to train her I suspect the reason is that you are not firm in your control of her, that you start out to control her but weaken. To cry herself to sleep is bad for the child but for her to grow up uncontrolled is worse.

Kernels in the Neck.—*L. P. B. writes: "In reply to 'Subscriber' you say the kernels that form in a child's neck are easily cured. 1. Please tell me how they are cured. 2. How can one tell whether they have any connection with tuberculosis or not?"*

REPLY.—1. Give the child plenty of nutritious food. Let him play out of doors all the time. Have his tonsils and teeth put in good condition. If absorption is occurring through the nose have that put in shape. Most cases of enlarged glands that have not suppurated will get well under such treatment. Tuberculin will help.

2. A tuberculin test.

Aid for Weak Ankles.—*G. S. says he has a boy, 3 years of age, with weak ankles, inclined inward. A physician informed him this would cause flatfootedness unless corrected. The doctor did not know what to do, and G. S. asks a remedy.*

REPLY.—If the condition is bad have an orthopedic surgeon work out the proper plan for relief. If it is only a matter of giving the ankle a different tilt an intelligent shoemaker will succeed. If the condition is less marked let him go barefooted in the summer time. Encourage him to exercise his leg and foot muscles.

Bath Not Harmful.—*H. B. A. writes: "Is a daily bath ever too much for a normally robust, sturdy little girl aged 5?"*

REPLY.—No; the custom is to discontinue the daily bath about the third or fourth year, but that is to save trouble.

Have Children Exercise.—*Mrs. J. O. K. writes: "I have adopted two children, a girl of 4 and a boy of 2, both of them being thin after a spell of measles and the mumps. I wish to know what to feed to them, as I want them to get robust. What should we eat to overcome constipation? What should a person who is anemic eat to become stout?"*

REPLY.—1. Plenty of vegetables, fruit, bread, milk and some meat. Have them exercise in the open air above everything.

2. Fruit, vegetables and bran.

3. Milk, bread, meat, vegetables and fruits. There are no special blood foods, or flesh foods or strength foods. Any food which is good, nutritious and wholesome is a blood food.

Keep Room Cooler.—*C. L. Z. writes: "What is the cause of a boy of 5 years having night sweats? He seems apparently well."*

REPLY.—It is of no consequence. Keep his room cooler and he will not sweat.

Do Not Use a Brace.—*T. J. S. writes: "What is the best way to get a 6-year-old girl who is round-shouldered to hold her shoulders back as she should? She is a light eater. Her hair is dry and comes out a good deal when combed. We have been using crude petroleum oil on her head, which has helped. We put the oil on in the morning and wash the head in the evening. Is there anything else that could be done to benefit the hair? She seems perfectly well; runs and plays all day, and sleeps soundly about ten hours each night. For the shoulders do you recommend exercising or a brace? If the former, what exercises, and if the latter, what make or kind?"*

REPLY.—Do not use a brace. Her shoulders are round because of one or both of two defects. Her chest is too narow, the curves in her spine are not as they should be, or both. In any event, the posture of her shoulders is an effect and you must go after the cause.

Boy Fitful Sleeper.—*R. M. H. writes: "My boy, aged 3½, is a restless and fitful sleeper, waking frequently, and crying out. His health is excellent and his evening meal not unduly heavy. He has been fretful at night since birth. He sleeps alone. What is the trouble?"*

Reply.—Ten years ago you would have given this boy worm medicine. When no worms came you would have said the medicine was no good. You have covered almost every point except two. Is the boy a mouth breather, waking when his mouth gets dry? What is his inheritance as regards sleeping? If the trouble is due to mouth breathing the remedy is removal of adenoids or tonsils. If it is inheritance you must do the best you can to make his sleeping environment quiet.

Night Terror.—*J. H. C. writes: "Kindly let us know what you would advise in the case of our girl, 4 years of age, who recently has awakened at night with marked symptoms of hysteria. For some minutes she would toss on the bed, striking at the air as well as beating her head. She seemed incapable of speech, although she talks excellently when fully awake. Her inability to recognize her mother at such stages is one of the distressing features of the case. She is naturally of a highly sensitive disposition and, accordingly, her training has been along the lines of persuasion and suggestion. Her food at all times has been carefully chosen and it is within the last six months that she has been given meat at all. She never drinks tea or coffee or partakes of any condiments whatever. Both mentally and physically her development has been normal."*

Reply.—The trouble with your child is night terror and not hysteria. Do everything to promote her physical health. If she has adenoids, enlarged tonsils or bad eyes have them attended to. Be careful as to her diet at supper.

Underlying night terror is a supersensitive nervous system. Send to the National Committee for Mental Hygiene, 50 Union Square, New York, for its pamphlets on training children.

Nervous While Asleep.—*V. C. writes that her boy is twelve years old. When he is asleep the muscles of arms and legs twitch and jerk—a sort of tremor every few minutes. She asks what would cause this condition as he is apparently in good health and large for his age.*

Reply.—He is dreaming and mentally tense. He should have less nervous excitement, particularly toward bedtime. He should have plenty of exercise; he should eat but little meat; he should be taught to relax mentally. There is no radical difference between nervous tension when asleep and when awake.

Little Lad Dreams.—*M. G. writes: "My little son, 4 years old, when asleep twitches and jerks his legs, arms, and quite frequently even his face twitches, sometimes to the extent of awakening him. This has continued since he was 2 years old. He is apparently in good health and is happy and bright. He also at times complains of cramps in the calves of his legs."*

Reply.—He is dreaming and his muscle twitching is associated with his dreams. To dream during sleep is as natural as to think while awake. Nevertheless, dreaming which is associated with twitchings and cramps is not so restful as sleep should be.

The probability is that the child's digestion is below par. Give him

a very little simple evening meal—not much bread, rice or sugar, or food of that character. Examine his stools repeatedly for worms, especially for pinworms. Do not allow him to play after supper, or to stay up late, or to get excited in any way. See that his bed is comfortable and his room well ventilated.

Your physician may find that he has adenoids.

Treatment for Children's Colds.—*L. E. F. writes: "What do you consider the best home treatment for ordinary colds in children? I am inexperienced, need the knowledge, and confess a fear to lasting results from colds."*

REPLY.—A purge, light diet, quiet in bed until the aching stage has passed. To keep them from having colds—keep them away from people with colds and out of warm, stuffy rooms. Read "Cause and Cure of Colds" by Sadler.

Mouth Breathing.—*Parent writes: "My daughter, 9 years old, grinds her teeth when asleep, breathes through her mouth, and tosses around in bed all night. Sometimes she sleeps on her arms and knees, but still grinds her teeth. None of the other children can sleep with her. What would you advise?"*

REPLY.—Have the school physician or your family physician examine her for adenoids and enlarged tonsils. Probably she is thrashing around because instinctively she wants to breathe through her nose but is forced to breathe through her mouth.

Diseases of Children.—*F. L. B. writes: "The real reason why most parents are not so averse as they might be expected to be to their children having measles, scarlatina, and mumps is that these diseases, which are rarely fatal to children when properly treated, are far more severe in their effects upon adults. Parents, knowing there is small chance of their children escaping these diseases all their lives, prefer that they should have them when they are small, when chances of fatal effects are so much less. As to scarlet fever (the real article) and diphtheria, I have never known any parents so foolish as to desire their children to have these deadly diseases. They are dangerous in the extreme to all—young and adults alike."*

REPLY.—The mistake under which you labor is so widely believed in that it should be corrected. In neither smallpox, scarlet fever, diphtheria, measles nor mumps is the disease more severe in grown people than in children. You cite three: scarlatina, measles and mumps. Scarlatina is nothing but scarlet fever and what is presently said of scarlet fever applies to it.

Mortality Statistics Bulletin 109, United States Census Bureau, analyzes 800,000 deaths in the registration area of the United States in 1910. There were 6,598 deaths from measles distributed as follows: Under 1 year of age, 1,540; 1 to 2, 2,027; 2 to 3, 1,002. Total under 5, 5,338, leaving 1,260 for all the years of later life. Of this number 852 deaths occurred in children of what is termed the school age, 406 were divided among the people between twenty and eighty-five. These statistics cover 54,000,000 people. For purposes of illustration, of all people forty-five years of age among this 54,000,000 only 7 died of measles.

Scarlet fever figures differ only in that the death rate is lower among babies and higher among school children. Age forty-five shows even bet-

ter with 2.6. Contagious diseases do not run a milder course in children than in adults. Clinical experience confirms the figures of the census bureau.

Condition Not Dangerous.—*Mrs. M. G. writes: "A boy of 8 is pronounced by a doctor abroad to have a heart which has nothing wrong with it, but is not strong actioned. 1. Is this condition at all dangerous? 2. Should any special precautions be taken with regard to games, running, etc., at school? 3. Is there any treatment which will strengthen a weak-actioned heart? 4. Would it be inadvisable to take a child or person with a not strong-actioned heart to live or stay for any length of time at a high altitude? The place I have in mind in asking is 6,000 feet above sea level."*

REPLY.—1. No.

2 and 3. A weak heart muscle in a boy of eight merely means that all his muscles are weak. What is good for his leg muscles is good for his heart muscle. See that he plays in the open air up to the limit of his capacity. If you can arrange it so that in school or on the playground he can have some group play under a playmaster so much the better.

4. No.

Children's Diseases.—*W. P. writes: "Please write an article telling people how unnecessary it is for children to have measles, scarlet fever, and diphtheria. I know a few people who believe it a good thing for children to have the diseases in order to 'rid their systems of impurities,' etc., and because 'all children have it, you know.' 1. Doesn't the board of health quarantine against measles? 2. Isn't a man who permits his children to suffer with measles without a physician's attention letting them take 'a chance' even if they are 'given purgatives and hot water baths'? 3. Does a child's physical organization suffer any consequences from an attack of measles?"*

REPLY.—Having a contagious disease gets nothing out of the system. The system of a person that has had a contagious disease is in no better condition and sometimes is in a much worse condition for having had the disease. In this day of enlightenment almost no children have smallpox; but a small minority have diphtheria, less than half have scarlet fever and not much over half have measles. Therefore, a mother who exposes her children to infections throws away a good chance of escaping them.

1. Yes.

2. Yes.

3. Usually the child is not violently ill. Recovery is usually complete. However, many children die. More nursing babies die of measles than of scarlet fever. Many children get pneumonia as a complication, some get Bright's disease, some suffer such changes that for years thereafter they are frail and delicate.

Feeding the Little Ones.—*P. A. H. writes: "I am the mother of two children under 7, whom I try to care for in the best possible way open to me, but in the last few months I have been led to wonder if I am finicky and fussy on points where I had thought I was only reasonably sensible. 1. Is dinner at 6:30 p. m. as good as at noon? I have always prepared dinner for the children at noon, even though I have to prepare another dinner for their father and myself at night. 2. Are fried potatoes, doughnuts, and pie suitable food to be served frequently (almost daily) to children?*

3. Is it worth the effort of a mother who also has the work of the house to do to provide especial foods for children, such as baked or creamed potatoes instead of fried, and custards, rice puddings, etc., for desserts? 4. Is it justifiable economy to cut down the butter that goes into the cream sauce, the egg that goes into the muffins, etc., for young, growing children? I am assuming actual poverty does not make it necessary. I hunt for places to add to the butter and egg allowances."

REPLY.—1. No.

2. Children can digest these articles much better than adults. Fed occasionally or somewhat oftener they are good enough.

3. No.

4. Do not economize on the children's food. You can well do so on that of the adults. In hot weather feed the children as little fat as possible. Give them bread, meat, sweets, fruits and candies.

Change Boy's Diet.—*Mrs. B. H. J. writes: "My son is 6 years old, about the right size, strong, rather thin, and active. Every month or two he has trouble, called by the doctors a bilious attack. There are high fever, a coated tongue, and bad breath. He has been doped with calomel time and again [one and one-quarter grains], which brings away great quantities of dark green mucus. Then he gets well. He has puffs under the eyes a great deal, but examination of the urine shows a nearly normal condition. He has always been troubled with constipation, which is hard to regulate by diet, as he cares for few vegetables or cereals. Bran bread seems to irritate the bowels and bring on attacks. Please advise me what to do to prevent these attacks."*

REPLY.—The dark green passages after calomel, usually held to be proof of the good done, is no proof at all. In the first place much of the green color is due to a mercury salt. In the second place the place for green bile is the liver, liver ducts, gall-bladder and upper intestines. In those locations it does good work. Whenever it passes beyond the zone things are not right. Therefore, green bile in the stools is a sign that the medicine is doing something that should not be done.

Do not dope the boy with calomel. If he needs to be depleted from time to time do it with something that will not produce so unnatural a result as green stools.

However, the proper plan is to change his diet. Train him to eat vegetables and fruit in quantity and to drink plenty of water. That may be somewhat troublesome but it is less troublesome than a bilious attack and a course of calomel once a month.

Growing Pains of Children.—*Mrs. T. B. H. writes: "Physiology says children sometimes have what are called growing pains in their arms and legs. Our little girl complains of some in her legs some mornings. Shall I consult a physician?"*

REPLY.—Yes. Growing pains are rheumatic and gouty. Infection through the throat must be thought of when the trouble is present in a child.

Child in Need of Treatment.—*F. C. writes: "I have a boy 4 years old who is in the habit of sniffling. Two or three months ago, as a result of this habit, a channel to his ear became affected, and his ear drum was operated on by one of our best specialists. It seems impossible for us to*

teach him to blow his nose, and we are fearful this habit will give him chronic catarrh. Have you any suggestions to offer as to the cure of this habit?"

REPLY.—Your child should be examined and treated. There is something behind a "habit of sniffling" which "blowing the nose" cannot remedy.

Promiscuous Feeding.—*E. T. A. writes: "Can you say something to help make promiscuous feeding of other people's children as bad form as promiscuous kissing? My children have been offered every kind of dainties at any time of the day, and I believe I am the judge of what and when they may eat. Do say something concerning a mother's responsibility as the sole guardian of young stomachs, please."*

REPLY.—Promiscuous feeding is even more important than promiscuous kissing. Making food into tissue is the child's daily task. Promiscuous feeding of children by promiscuous people is like the promiscuous use by promiscuous people of a monkey wrench on an engine.

Bananas Good for Child.—*Mrs. G. E. N. writes: "Do you consider the daily use of bananas either as a breakfast fruit or dinner dessert desirable, they being the cheapest and most easily obtained fruit? Do you consider a dish of sliced bananas with sugar and cream, eaten with several slices of bread and butter, a dish of cereal, and a glass of milk a proper summer breakfast for a healthy child of 9 years?"*

REPLY.—Yes, one or two of them. Bananas should be chewed. When bolted the stomach juices cannot get in well.

Take Child to Specialist.—*J. L. W. writes: "What is the common sense way to treat earache in children? My little girl, 6 years old, is a sufferer from earache; not chronic, but there appears a tendency to trouble at times when she has played outdoors in the wind, or got her feet wet."*

REPLY.—To relieve the pain a hot water bag should be placed against the ear. A general hot bath will be of service. If absolutely needed paregoric may be given. So much for that part.

Earache is due to infection which travels from the throat to the ear. To treat earache properly the throat must be treated. She should be taken to a throat specialist. Most of the deafness of middle life is due to just the condition described by you.

Have Child Examined.—*M. G. C. writes: "A healthy child of 5 is frequently chafed and irritated. Is the cause urine, or could there be a discharge from the vagina that causes the itching and smarting? What course should be pursued?"*

REPLY.—The cause might be thread worms. It might be a gonococcal infection. Have an examination to discover what is the cause.

Food for Young Child.—*M. A. R. writes: "Will you kindly advise the best combination of foods to be given to a healthy, normal, female child of three and a half years to four years of age?"*

REPLY.—At the age of four years a child may share the general table diet providing it is plain and varied. Fried and highly seasoned foods should not be given.

As to quantity a healthy child should be permitted to satisfy her appetite if she eats slowly and masticates thoroughly. Breakfast should consist of milk, a cereal and cream and bread and butter. An egg, fresh fish or chicken may be added. For dinner give soup, meat, bread and butter and some light vegetables. Junket, or pudding, milk, toasted bread and butter and stewed fruit will do for the evening meal. Fresh fruits may be given before or after meals.

Tea, coffee and alcoholic beverages are not for the use of children. Make meat prominent in the diet.

Celluloid Toys.—*L. S. writes: "Are celluloid toys dangerous for babies as to explosion on catching fire? Are they dangerous only when exposed to open fire, or will striking cause them to explode?"*

Reply.—They are dangerous. An open fire or a high degree of heat can ignite them. I have never heard of a spark from a blow exploding a celluloid toy.

Sleep for the Child.—*Mrs. F. C. H. writes: "My son, 2 years and 5 months old, has always been accustomed to long afternoon naps. As he grows older he is less inclined to go to sleep, sometimes requiring stories and urging for more than an hour. When he wakens it is too dark for him to go out again, and he then cannot be made to go to sleep before 8:30 p. m. We have always had him out every possible moment, and it seems too bad these beautiful fall days for him to spend so much time in the house. Would it be detrimental to him to discontinue or omit the afternoon nap and put him to bed at 6 o'clock? He is normal in every way except he has to be urged to eat practically every mouthful."*

Reply.—I would hesitate to advise you to discontinue the boy's naps but you can shorten the time to advantage. Wake him at the end of two hours and maybe one. It he rests quietly for some time before dropping off to sleep count that out of his sleeping time on the basis of sixty minutes of rest in bed while quiet but awake equaling about thirty minutes of sleep. If he is a fitful eater encourage him to play actively since play gives him muscular exercise.

Baby Likes to Eat Mud.—*Mrs. J. F. writes from Green Bay, Wisconsin: "My son, 2 years 8 months old, seems perfectly normal except for strange appetites. He will eat mud, mortar, or coal unless watched, and seems to be hungry for such things. When put to bed he rolls from side to side, singing himself to sleep. He wakes up in same manner. His diet is carefully watched. He seems sturdy, and is fat, but at times he is quite pale. Kindly advise me as to method, other than punishing, of curing these morbid habits."*

Reply.—The child should be studied, not punished. The probability is that he has a mild case of scurvy or rickets. If this is the trouble the remedy is to feed him plenty of fresh meat, fruits and vegetables. He may have a nervous trouble. It may be that the need is for companionship with children mentally more normal; if so, kindergarten will cure him. The family physician and the mother should carefully study the child to find the reason and correct it.

Starch Craving Unnatural.—*M. C. K. writes: "I have often heard of people craving starch. My small daughter eats laundry starch whenever*

she can get it, and I watch her continually, fearing that it is injurious. Does this habit grow? Is it harmful? What causes it?"

REPLY.—She cannot digest raw starch. It ferments in her intestines. Both children and adults are liable to starch indigestion.

I suggest that you see your physician. The craving is unnatural. Such cravings may indicate chlorosis, or intestinal catarrh.

Feeding Year-Old Child.—*D. F. writes: "May I trouble you to let me know what you consider a proper diet for a baby 1 year old, just weaned and perfectly healthy? She has a good appetite and does not find milk sufficient."*

REPLY.—1. Feed regularly.

2. Milk with one-fourth its quantity of barley or oatmeal water should form the basis of the diet. Six to eight ounces of this mixture may be given at a feeding.

3. A little stale bread, potato and butter, zwieback, beef soup, white of an egg, prune or orange juice may be given alternately.

4. Rich foods should not be given at this period; solid food not until the child is able to chew it.

5. Watch the child closely for evidence of indigestion. Be guided by your physician in changing the food and feeding habits as soon as trouble shows.

Feeding the Baby Potatoes.—*G. F. M. writes: "Kindly inform me whether mashed potatoes with butter or meat gravies in moderate quantities given to babies more than a year old cause constipation or are in any way harmful to them."*

REPLY.—If given in moderation potatoes with gravy and butter will be all right. It will not cause constipation. Begin with a small portion and gradually increase the allowance. However, the quantity given can be easily overdone.

Nodding Spasm.—*C. E. W. writes: "My baby girl, 14 months old, has been since birth a healthy, normal child. She is heavy for her age, weighing 35 pounds; she talks and walks and eats heartily of milk, eggs, cereal, fruits, and soups. At the age of a year she began to develop a shaking of the head. Her head moves constantly, and the shaking from side to side is in appearance like an aggravated case of palsy. Except for this condition the child seems to be in perfect health. What could cause it? What treatment would you advise? Is it curable?"*

REPLY.—Your child has what is usually known as nodding spasm or Henoch's spasm of the head. Have you noticed that the eyeballs are moved almost constantly (nystagmus)? The condition develops sometimes in teething children. Rickets is the cause in many cases.

It generally responds to a regulated diet, life in the open air and the use of some preparation of phosphorus. The outlook for cure is good. You should have your physician see her.

Cleft Palate.—*M. M. L. writes: "Is there any cure or remedy for a 'split' palate, antedating the birth of the child, who has now reached the age of 16, without any lessening of the impediment in speech caused thereby? Is there any artificial appliance made which would prove of benefit in a case of this kind?"*

REPLY.—In the development of a child the growing in of a membrane to divide the nose from the mouth takes place rather late. The membrane (both the hard and soft palate) grows as a plate coming down from each side, finally growing together in the middle. This is the way it happens in the mouth. The lips follow a somewhat different plan. It sometimes happens that halves do not completely unite—then we have cleft or split palate. It should be operated on. The earlier the better because the child must learn to use the muscles differently in talking.

Stature.—*A. R. writes: "I have a son 12 years old who is no taller than boys 9 years old, and I am afraid he always will be small. My husband is 5 feet 10 inches tall and I am 5 feet 6 inches. Both are strong and healthy. The two other children (girls) are of proper height. He is the second child. Some time ago I read that a British physician prescribed thyroid extract for a boy 18 years old and the boy gained seven inches in six months. Can you give me information about it?"*

REPLY.—In determining stature three factors must be considered—inheritance (of great importance), ductless glands and nutrition. In deciding whether inheritance is the cause it is necessary to consider the family tree as far back as the four grandparents at least. One short grandparent is most likely the explanation of the shorter stature of your son. It has been demonstrated that plenty of exercise leading to good muscular development and an abundance of food helps. As to whether the use of ductless glands taken by the mouth will help or not I hesitate to express an opinion. The matter is being investigated in many different quarters and information sufficient for guidance should be forthcoming before long. Do not give your boy thyroid except under medical guidance. The drug is too powerful to be otherwise taken.

Harelip Can Be Cured.—*Mrs. A. C. writes: "A child was born here with a bad case of harelip and cleft palate. What is the cause of that? Had the baby lain in such a condition before birth as to prevent proper development? Some old people say it is a birthmark, caused by the mother being frightened. Is that so? If it is properly attended to from the start, can it be cured? This child was immediately taken to a specialist, who put a few stitches in the palate. That seemed to help enough so a little food could be taken through his mouth. Two weeks after a wire was placed so as to draw the two parts together. This has been done about three times. The last time the jaw bone was split on the opposite side. It has helped some, but during the last couple of months nothing has been done, and that deep gash in his jaw looks anything but promising. Please state your opinion of such a case. He is 7 months old."*

REPLY.—The mother being frightened and the position of the child have nothing to do with the case. As the child is being formed the upper lip develops from four centers. If the four separate pieces fail to grow together just right a harelip results. The reason for harelip is so easily understood by studying the development of the mouth that it is hard to see how all the foolish ideas got started as that about birthmarks, mother being frightened, position of child, and the like.

Harelip can be cured. As your physician does not seem to be doing well get him to direct you to a specialist in operations on harelip.

Will you not also write to the Eugenics Laboratory, Cold Spring Harbor, N. Y., if you know of other cases of harelip in this family?

CHAPTER XLVI

First Aid

Not to know what to do in minor emergencies is somewhat of a disgrace now. First aid is being taught by scores of agencies and nearly everybody is being reached. The American Red Cross is teaching it by a number of approved methods. The national and state governments are covering some part of the field.

First aid is a large part of the program of the Boy Scouts and the Camp Fire Girls. The Y. M. C. A. teaches it to its members. The large employers keep first aid posters conspicuously displayed and some provide

FIG. 309.—METHOD BY WHICH ONE MAN CAN CARRY A WOUNDED MAN.

FIG. 310. — ANOTHER METHOD BY WHICH ONE MAN CAN CARRY A WOUNDED MAN.

systematic care in first aid. The boys who have been trained in the army, navy and militia know what to do and what not to do.

Books on first aid, clear and simple in text and well illustrated, are sold for a few cents. Among these none is better than the series written for the Red Cross by Major Charles Lynch of the United States army. From the Manual of Instructions most of the following is taken.

The materials for first aid are given as bandages, compresses, splints, tourniquets, stimulants and emetics. The surgical instrument houses sell first aid packages containing material often needed. Simple pocket first aid packages constitute one form; another form is a portable case and a third, more fully equipped, is intended for use in an emergency hospital.

No person should be near a patient but those actually needed for help. The injured person needs air. Furthermore, he should be spared the mental shock of seeing a mob of strange people crowding around him.

The best position for the patient is lying flat. If the face is flushed it is safe to raise the head enough to put a pillow under it. If the face is pale the head must not be raised from the floor. If the patient is vomiting the body should be turned on the side and the head turned so that the vomit runs out of the mouth. Beyond this no lifting of the head is justified. To raise the head straight up is greatly to increase the danger that the vomit will go by gravity into the windpipe.

FIG. 311.—A SHORT STRETCHER MADE WITH TWO RIFLES.

No water or stimulant should be given. Unless consciousness has fully returned the liquid is apt to go into the windpipe. On account of the tendency to nausea from shock the liquid, whatever it may be, is liable to cause vomiting. Whisky does more harm than good and brandy has no advantage over whisky.

A distinguished woman physician was once hauled from hospital to hospital when suffering from the shock of an apoplectic attack because someone had given her whisky when she became faint and the hospital attendants, smelling whisky, thought she was drunk.

A prominent woman was carried to a police station and neglected for several hours though suffering from concussion as a result of a fall because some busybody tried to pour some whisky down her throat as she lay half conscious.

As a general rule, after a few minutes of unconsciousness the rested heart again becomes equal to its task and no stimulant is needed. Generally speaking, any consciousness that returns after a stimulant would have returned without the stimulant and those cases in which consciousness does not return spontaneously are harmed by stimulants.

If a person who has been unconscious would like a bracer give him

half a teaspoonful of aromatic spirits of ammonia in a fourth of a glass of water.

A person recovering from a hurt generally wants water. This is because shock has paralyzed the salivary glands and not because he needs water. If he insists give him a few sips, but see that he sips it; or give him a piece of ice to hold in his mouth or gum to chew.

Loosen the collar and all tight clothing. If there is profound shock—

FIG. 312.—METHOD BY WHICH TWO MEN CAN CARRY A WOUNDED MAN.

Cover the body well with blankets.
Put hot bricks to the extremities.
Rub the limbs briskly.
Place flannels wrung out of hot water or towels over the abdomen.
Put ammonia or smelling salts to the nose.
Give hot coffee or aromatic spirits of ammonia.
Introduce two fingers into the rectum and stretch the sphincter muscle.

After severe injuries it may be advisable to move the patient. Do not do so until search has been made for fractures.

If there is a fracture of the arm above the elbow or leg above the knee or if both bones of the lower leg are broken the patient must not be moved until the broken limb is splinted.

For this any sort of a board or rod or broom handle will do. To this the injured limb must be securely tied in several places.

FIG. 313.—COMPRESS THE CAROTID ARTERY FOR SEVERE HEMORRHAGE ABOUT THE HEAD AND NECK.

The patient generally knows when a bone is broken. Works on first aid give signs by which one may know when there is a fracture. Such are deformity, crepitus, and the like. The person hurt will generally tell you

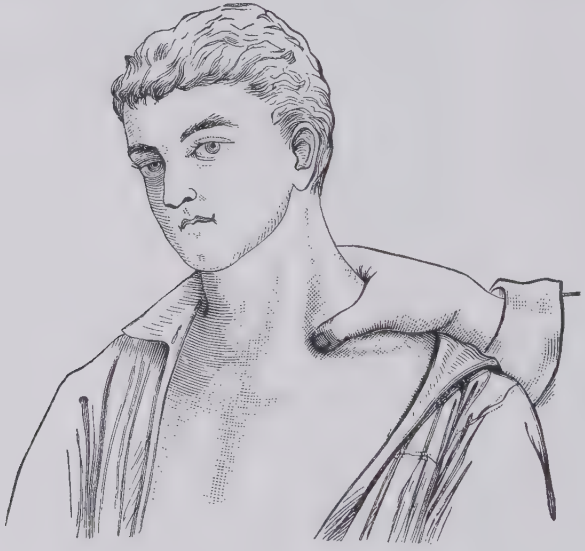


FIG. 314.—DIGITAL COMPRESSION OF SUBCLAVIAN ARTERY.

offhand of the fracture and where it is, and probably the inexperienced helper had better accept the diagnosis and proceed accordingly.

If there is a compound fracture, that is, if the broken bone sticks through

FIG. 315.—DIAGRAM SHOWING POSITION OF IMPORTANT ARTERIES. The arteries shown in heavy cross-bars are superficial and can be compressed at points in area shown. Arteries shown in dots are deep.

the skin or if there is a wound extending down to the break the wound must be covered by the compress found in the first aid packet and then the limb must be splinted to something solid and firm.

In treating the wound the fingers must not touch the bone or the wound. It is highly desirable that the wound should not become infected and to inspect it or handle it is to invite infection.

When the fracture is of the backbone or of the neck the warning against reckless handling of the patient must be emphasized. It may be better to leave him where he is until the doctor comes.

If he is to be moved it must not be done until the back and neck are

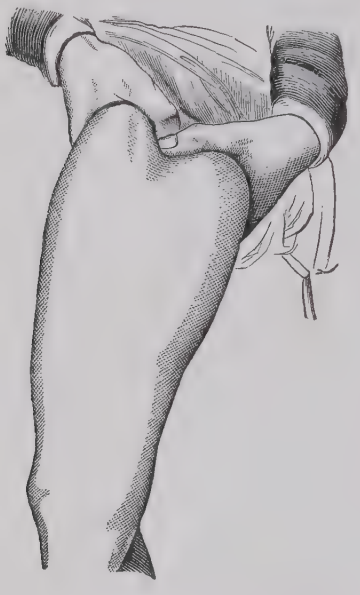


FIG. 316.—DIGITAL COMPRESSION OF THE FEMORAL ARTERY.

FIG. 317.—TOURNIQUET TO CONTROL HEMORRHAGE IN THE FOREARM OR HAND.

rigidly splinted; otherwise the broken bone may tear the spinal cord and do irreparable harm.

Whenever wounds break the skin the part must be protected to prevent germs from getting in. The few that are driven in by the agent producing the wound stand a good chance to be destroyed if no more are carried in.

It is well to encourage wounds to bleed and ooze up to a certain point. Bleeding and oozing constitute the best sort of washing. It is much better to put nothing on a wound than to put on any unclean thing. In fact, it is better to put nothing on than to put on anything about which you are not certain.

At the present time there is a decided movement toward the open treatment of wounds. When one has a first aid packet he should open up the wrapping and apply the compress and do it without washing the wound. Leave that for the doctor.

In case the hemorrhage from the wound is excessive, the treatment of the hemorrhage takes precedence over treatment of the wound. If the hemor-

rhage comes in spurts it is from an artery. If it is a steady flow it is probably from a vein especially if it is dark.

If the blood is spurting deep pressure should be made on the skin between the bleeding point and the heart. If the blood is from a vein the pressure should be on the other side of the wound.

Pressure in the wound is often ineffective because the cut vessels may contract until it is out of the wound. It is so liable to infect that it is rarely justified.

Often in arterial hemorrhage some near-by artery between the cut and the heart can be seen throbbing and pressure upon it will speedily show whether it or its branch is the vessel injured.

If the bleeding wound is in a limb the tourniquet can be applied. For this no special anatomical knowledge is required. Students taking first aid courses are always taught some score or more points at which important blood vessels can be reached, for example, just in front of the ear, where the lower jaw can be felt working in its socket; over the throbbing artery in the temple; in the neck at the front border of the heavy muscle running from the breastbone to a point just behind the ear; deep in the hollow behind the collar bone; at the inner border of the big muscle of the front of the arm—the biceps; at the middle of the groin.

Fig. 318.—Compressing the Femoral Artery with Tourniquet and Pad for Severe Hemorrhage in Leg.

INTERNAL HEMORRHAGE

In internal hemorrhage have the patient lie flat. Apply cold over the organ where the bleeding is located. Put hot bricks to the feet. Do not give stimulants.

NOSE BLEED

If mild, do nothing. When severe grasp the two nostrils with the finger and thumb. Press the soft wings against the septum. Have the patient lean forward. The purpose is to allow the nose to fill with blood and to give this blood time to clot. Apply a cold cloth wrung out of ice water to the back of the neck or place a piece of ice under the upper lip between that and the gum. Press on the lip.

Cold water or ice on the back of the neck or over the bridge of the nose. A towel wrung out of cold water and placed around the neck with one end

over the bridge of the nose. Pinch the nostrils together. If bleeding persists, plug with a piece of cotton. Tie a thread around a piece of cotton as large as the end of the thumb; soak in strong tea or lemon juice; push gently up into the nostril. After the bleeding has stopped for about a half hour pull the cotion out gently by the thread.

DISLOCATIONS

A man giving first aid should never try to replace a dislocated joint except in two locations—fingers and jaws. To try will generally mean to fail and the hauling and pulling may harm important structures. It has happened that large blood vessels have been torn and important nerves have been paralyzed. In case of dislocation the injured limb should be snugly wrapped and made as comfortable as possible while help is being secured.

Fig. 319.—Compressing Brachial Artery for Severe Hemorrhage in the Elbow, Forearm and Hand.

DISLOCATION OF THE LOWER JAW

Tear a handkerchief in two. Wrap one piece around each thumb. Place the thumbs in the mouth pressing against the crowns of the teeth on each side. With the fingers seize the lower jaw on each side. Press down and backward. As the head of the bone slips into its socket the molars will clamp the thumbs unless they are quickly slid toward the tongue.

DISLOCATION OF A FINGER

By grasping the finger with one hand above the dislocated joint and with the other below it and making gentle traction the joint will slide into place. A little gentle flexion and extension will be of service.

RESCUE OF PERSONS AT FIRES

Lynch, after advising that persons going into a burning building tie a wet handkerchief around the nose and mouth, says: "Remember that the air within six inches of the floor is free from smoke; so when unable to breathe crawl along the floor with the head low, dragging anyone you have rescued behind you. Crawl backward in the same way down a staircase or any slope."

TREATMENT OF A BURN

Exclude air by a thin paste made with water and cooking soda, starch or flour. Smear on a cloth and cover the injured surface. If these are not

at hand use vaselin, lard, cream or any grease. In using grease use the cleanest possible. Do not use old grease or dirty grease. Do not use carbolized grease. If time will permit heat the grease and then cool it before

FIG. 320.—ARTIFICIAL RESPIRATION, INSPIRATION, PRESSURE OFF.

using it. To boil is not necessary. A place where burns are frequent should always carry a picric acid compress or picric acid bandages. When these are available they should be used instead of the soda paste.

FIG. 321.—ARTIFICIAL RESPIRATION, EXPIRATION, PRESSURE ON.

Burns with acid should be treated with lime wash made of lime scraped from the wall and thrown into water, soapsuds or milk of magnesia.

Alkali burns should be washed in vinegar, lemon juice or hard cider.

ELECTRIC SHOCK

The safest means of rescue when it is possible is to short circuit the current before it reaches the persons shocked. This can be done by dropping a metal bar or rod or a wet stick or rope on the side between the power and the person. If the live wire is on the ground and the person is on it it will be safe to roll him off with the hands. If the live wire is on the prostrate person it will be safe to fleck it off with a dry stick if the hands are dry. Of course it is much safer to handle the wire with a glass rod or

with hands covered with rubber gloves. If neither of these is at hand covering the hands with a mackintosh is fairly safe.

The patient is to be covered with warm wraps. Artificial respiration

Fig. 322.—Blanket Stretcher.

is to be done if breathing has stopped. In some cases respiration having started up will stop again. In that event artificial respiration must be resumed.

Fig. 323.—A Pillow Used as a Temporary Splint in Fracture of the Leg.

The household emergency box should contain the following, according to Lynch:

Alcohol.
Aromatic spirits of ammonia.
Castor oil.
Epsom salts.
Powdered mustard.
Lime water.
Bicarbonate of soda.
Sirup of ginger.

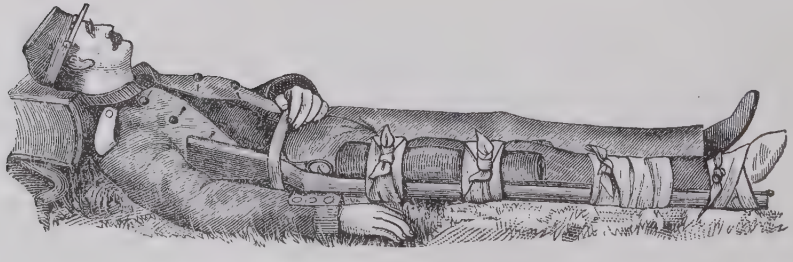


Fig. 324.—Gun Used as a Temporary Splint in Fracture of the Femur.

Sirup of ipecac.
Witch hazel.
One-tenth grain calomel tablets.
Carbolized vaselin.
Five grain bismuth tablets.
One dram oil of cloves.
Soda mint tablets.
Talcum powder.
One package antiseptic gauze.
One-half pound absorbent cotton.
Six gauze roller bandages.
Two Red Cross First Aid outfits.
One roll oiled silk.
One small bottle collodion.
One box tooth wax.
One box tooth plasters.
One pair scissors.
One sharp knife.
Pins.

FIG. 325.—SLING MADE FROM COAT.

SOME MINOR AILMENTS

COLIC AND CRAMPS

Appendicitis starts with colic. Fever comes after.

Gall stones cause a colic, but the pain is liable to be so severe that it is referred to as "stabbing." The shock with gall stones is usually severe.

Kidney stones cause a colic. The pain shoots into the genital organs.

Then there is the ordinary abdominal colic known as cramp or colic. It is caused by spasm of the muscles of the intestinal wall. When much shock is present look for a cause. If fever follows the colic look for a cause.

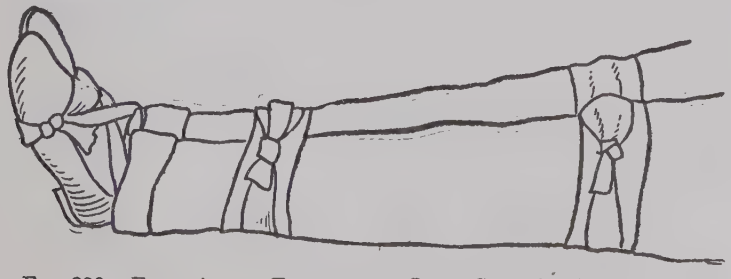


FIG. 326.—FIRST AID IN FRACTURE OF LEG. Strapping legs together.

Treatment—Put a hot water bottle over the seat of pain. Take essence of peppermint or sirup of ginger in warm water or take soda mint tablets. Take a purge. Produce vomiting where indicated.

TRANSIENT DIARRHEAS

Give a laxative—sirup of rhubarb, castor oil or A. S. & B. pills. A dose of salts or purgative water acts more quickly. To ease the cramping give sirup of ginger, a teaspoonful in water after each passage; or paregoric in teaspoonful doses, repeated when needed at four hour intervals; or Squibbs'

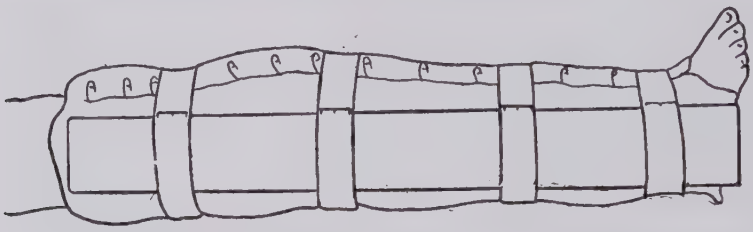


FIG. 327.—FIRST AID TREATMENT OF FRACTURE OF BOTH BONES OF LEG.

cholera mixture. Cholera mixtures and paregoric contain opium and therefore should be taken cautiously. Stop all food except boiled milk. If the diarrhea persists see a physician.

Diarrhea in babies is a more serious matter and it is taking chances

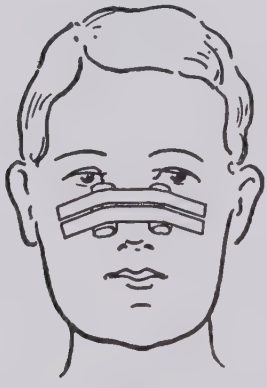


FIG. 328. — FRACTURE OF NOSE.

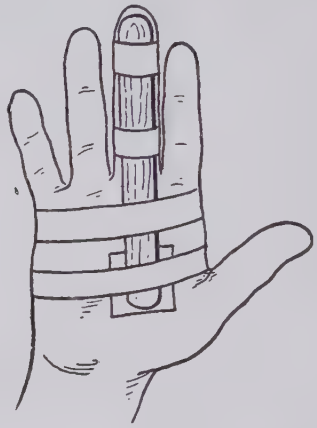


FIG. 329.—FRACTURE OF FINGER. WOODEN SPLINT APPLIED TO PALM SURFACE.

to doctor it at home. When a baby gets diarrhea give a dose of castor oil and watch the food closely. When the oil acts and the diarrhea does not stop, see a physician.

NAUSEA AND VOMITING

Nausea may be due to some food which has disagreed. In that event home treatment is all that is needed. It will save trouble to empty the stomach. Two glasses of lukewarm salt or mustard water may be given. It may be necessary to put the finger in the throat or to tickle the throat with a feather. After this use a little cold water and a soda mint tablet.

Many forms of severe infection [scarlet fever] begin with vomiting. In certain diseases poisons in the blood are excreted by the stomach and nausea results. Therefore the field for home treatment of vomiting is somewhat limited.

HICCOUGH

Between the chest and the abdomen is a great muscle called the dia-

Fig. 330.—Break of Bone in Back of Hand. Corresponding to Right Middle Finger. Corrected by Bending Hand Over a Bandage Held in the Palm with Adhesive Plaster Reaching from Back of Hand to Front Part of Wrist.

phragm. Hiccough is due to spasmodic contraction of this muscle. Transient hiccough can be relieved by holding the breath just as long as possible, or by intently trying to bring the two index fingers close together without touching them, or by throwing a glass of cold water on the face, or by any one of a half dozen tricks.

If these do not bring relief vomiting should be induced. If the hiccough is disturbing enough to warrant nervous chills apply warm applica-

Fig. 331.—Fracture of Wrist. Colles Fracture.

tions and give a cup of hot tea. If there is much shock give twenty drops of aromatic spirits of ammonia.

Stop up both ears with the fingers of each hand and drink water slowly from a cup held by someone else. Produce sneezing. Pull tongue out and put a piece of sugar or soda on it. Hold out for a few minutes.

NEURALGIA

Apply hot applications or rub with a menthol pencil or with some good, warm, aromatic liniment.

EMERGENCIES

The following suggestions are for the mothers who may or may not have a first aid kit handy. Children especially are prone to fall down and skin their knees. Bumps are of everyday occurrence. Children are constantly getting into mischief resulting in emergencies for which few mothers are prepared.

BLACK EYE

Bathe the eye immediately with hot water and rub it very gently.

FOREIGN BODIES IN NOSE

Children are much inclined to push corn, beans and other small objects up into their noses. The first thing to do is to tickle the nostril with a thread or feather until the child sneezes. Do not push anything into the nose as

FIG. 332.—DISLOCATION OF BOTH BONES OF THE FOREARM BACKWARD, SHOWING POSITION OF THE ENDS OF THE DISLOCATED BONES, DEFORMITY OF ELBOW, AND POSITION OF FOREARM.

it may push the objects up farther. Have the child blow the nose. If these simple procedures fail call a doctor.

NOSE BLEED

See page 865.

CHOKING

Slap on the back between the shoulders. Raise the child's arms as high as possible above the head. If the object is small let it go through the body. Have the child eat bread or potatoes. Do not give castor oil or other laxative.

HICCOUGH

See page 871.

BITES OF INSECTS

For the relief of bee stings, mosquito, fly, spider, bug and other insect bites applications of damp baking soda or ammonia water will afford relief.

RUSTY NAIL WOUND

Wash the foot and wound with warm water and soap. Thoroughly cleanse the wound with peroxid, then with alcohol, and paint with several coats of tincture of iodin.

FIG. 333.—ARTIFICIAL RESPIRATION, SYLVESTER METHOD. EXPIRATION.

BURNS

See page 866.

BRUISES

When the skin is not broken apply cloths wrung out of hot water; then apply witch-hazel. If the skin is broken cleanse the wound with castile soap and warm water; then use boracic acid solution and apply zinc oxid.

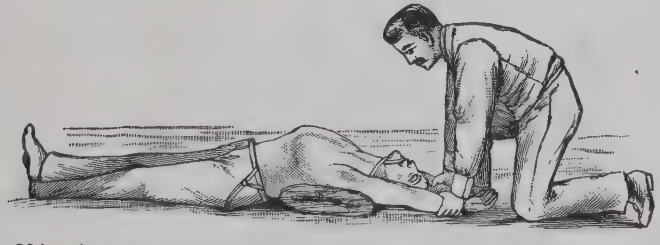


FIG. 334.—ARTIFICIAL RESPIRATION, SYLVESTER METHOD. INSPIRATION.

CUTS

Cuts should be washed and cleansed with peroxid, a piece of gauze dipped in boracic acid solution should be applied and then the cut bandaged. If the cut is deep make a pad of many thicknesses of the gauze and bandage tightly. If the cut is large and requires stitches call a doctor.

ARTIFICIAL RESPIRATION

This procedure is simple. A certain sort of artificial respiration consists in expelling the air by pressure on the chest sixteen times a minute. As soon as the pressure is relieved air will flow into the lungs. On this

FIG. 335.—ONE METHOD OF RESUSCITATION AFTER DROWNING. CAN BE EMPLOYED BY ONE MAN. DRAINS THE LUNGS; LIFTING, ESPECIALLY WITH ARMS UNDER BODY, EXPELS AIR FROM THE LUNGS; NORMAL EXPANSION DRAWS IN AIR. TO BE REPEATED FOURTEEN TIMES TO THE MINUTE.

simple procedure the different artificial methods of respiration are built. No one of them is difficult to carry out. A Boy Scout or a Camp Fire Girl can carry them out just as well as can a physician.

Sylvester Method.—Clean all water and dirt out of the nose and mouth. Roll the person on his back. Elevate the shoulders about two inches by putting his coat under them. Have someone pull the tongue out slightly and hold its tip just outside the lips. Place a watch where the operator can see it. Unless checked by the watch the respiratory movements will be gone through with too rapidly.

Kneel just above the person's head facing towards him. Catch both his arms just below the elbows. Draw the arms outward and upward until they

FIG. 336.—ARTIFICIAL RESPIRATION. HALL METHOD.

are pointing toward your abdomen. Hold in this position two seconds. This moving pulls the chest upward. As it moves upward the ribs move outward. Thus a partial vacuum is created in the bronchial tubes and air rushes in to fill it.

Carry the arms back to the side and front of the chest following the track through which they were lifted. Complete this movement by firm pressure on the lower part of the chest exerted through the person's elbows. This second movement compresses the chest, drives out the air and places the structures of the chest in such condition that the spring back when the pressure is relieved will pull air deep into the chest.

This is a respiratory cycle. It should not be gone through oftener than sixteen times a minute. If artificial respiration is worth doing at all in a given case it is worth keeping up for two hours.

Laborde has suggested an addition which can be carried out by some careful person while artificial respiration is going on. More care is required for the Laborde procedure than for artificial respiration.

The suggestion is that every time the hands are carried above the head the person holding the tongue shall draw on that member. The tongue is allowed to go back into the mouth as the arms are carried to the chest. Traction on the tongue must not be too strenuous.

While artificial respiration is going on the body must be wrapped in

blankets and hot bricks put to the feet. If the person has been in the water the wet clothing must be removed, the body dried and warmly wrapped. Sometimes a nervous shock will start the breathing apparatus; such would be ammonia to the nose, anal stretching and rectal injections of warm coffee.

FIRST SUNSTROKE TREATMENT

The elevated roads of Chicago furnish each of their employees with a vest pocket manual of first aid in emergency accident cases from which I extract the following instructions for cases of sunstroke and heat prostration:

"Carry patient quickly to shaded spot out of the direct rays of the sun and get all the fresh air possible for him. Place patient upon his back and remove all clothing from neck, chest, and waist. Put ice to the head and temples and pieces of ice over the body and arms. With a large piece of ice gently rub up and down along the spine. Do not be rough in rubbing the patient.

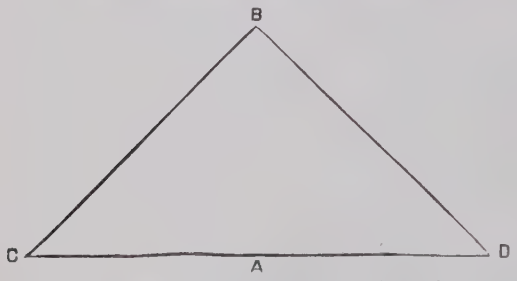


FIG. 337.—TRIANGULAR BANDAGE. A, base; B, apex; C, D, basal ends.

"If a hose and water are close at hand, turn a stream of water over the entire body and keep it running over him continuously. Do not give any liquids by mouth. Place a handkerchief or piece of gauze, saturated in spirits of ammonia, near the patient's nose. If an oxygen tank is handy, place the oxygen tank on one side of the patient's nose and turn on a fine spray of oxygen.

"Keep up a brisk massage of the legs and arms to stimulate the circulation. These cases are hospital cases; so follow the above rules until a physician or ambulance arrives."

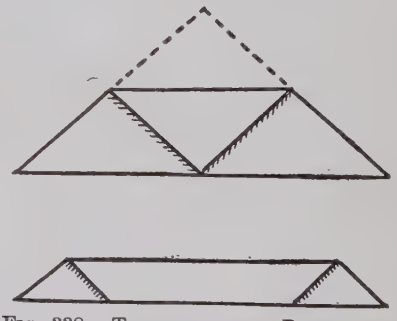


FIG. 338.—TRIANGULAR BANDAGE FOLDED ONCE AND TWICE.

The reason for the insistence that sunstroke cases are hospital cases is that there are different affections due to heat. Heat cramps, heat prostration and some cases of heatstroke yield readily to the simple treatment indicated. Sunstroke of the more violent kind, especially of the asphyxial type, is a severe condition calling for a high degree of medical skill.

In addition to the immediate effects of heatstroke and sunstroke there are later effects. Osler tells of a man who subsequent to a sunstroke could never stand a temperature of over 75°. He lived in a cellar for a summer or two and then moved to Alaska. Some are made so sensitive to heat that in summer they get severe headaches, they have ugly tempers and they may become delirious or insane.

In every case of violent sunstroke there remains behind some meningitis. In some cases there follows a violent form of progressive chronic meningitis.

FIRST AID REQUIREMENTS

The article telling of the first aid packet required by ordinance in Arlington, Massachusetts, stimulated a correspondent to inform us that the

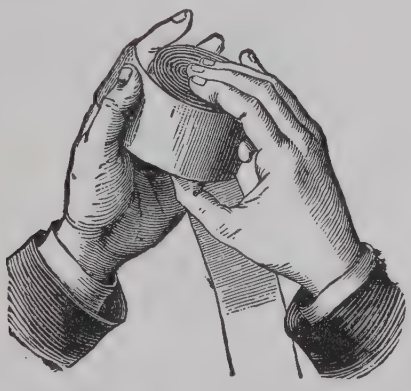


FIG. 339.—METHOD OF ROLLING A BANDAGE.

Massachusetts law, chapter 557, acts of 1914, require every factory to keep a first aid package at hand. Acting under this law the state Board of Labor requires the following articles in first aid packages:

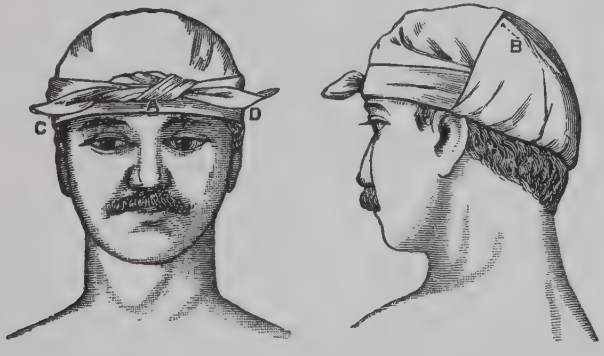


FIG. 340.—TRIANGLE BANDAGE FOR HEAD. The base A is placed downward over the brow, and the apex B at the nape of the neck. The basal ends C and D are carried backward over the ears and crossed over the apex below the external occipital protuberance, the "bump" on the back of the head. This prevents the bandage from slipping upward. The basal ends are then returned to the front and tied, the apex being turned upward and pinned to the body of the bandage.

One two ounce bottle of aromatic spirits of ammonia (to be renewed every three months).

One two ounce bottle of 4 per cent boric acid solution.

One two ounce bottle of alcoholic iodin.

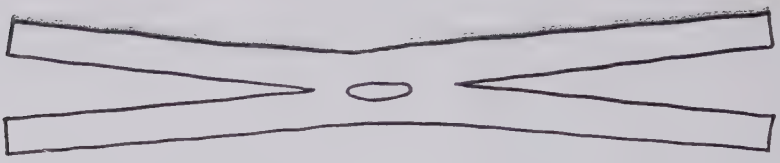


FIG. 341.—FOUR-TAILED BANDAGE FOR FRACTURE OF LOWER JAW.

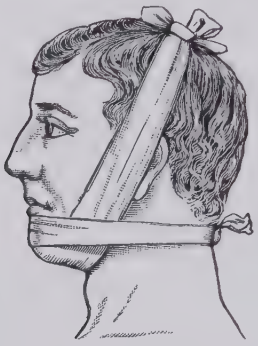


FIG. 342.—FOUR-TAILED BANDAGE FOR CHIN. Place the center of the bandage (see Fig. 341) against the chin with the wide tails below, when the latter are turned upward and tied on top of the head. The upper or narrow tails are carried backward and tied at the nape of the neck.

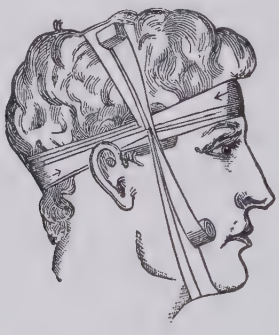


FIG. 343.—DOUBLE-HEADED, KNOTTED BANDAGE. The double-headed knotted bandage is made of a strip of muslin about eight yards long and two inches wide, and rolled into two heads or cylinders. The knotted bandage is generally used to arrest hemorrhage from the scalp by making pressure upon the temporal artery, which is situated just in front of the ear and extending upward into the scalp. The pulsation of this vessel can easily be felt. Before applying the bandage, a firm compress should be placed over the artery at a level with the upper border of the ear. A piece of cork, for example, about half an inch thick and the diameter of a silver half-dollar, should be enveloped in a piece of soft muslin and applied over the artery. The operator then, holding a roller in each hand, places the outside of the bandage against the compress and carries one roller around the head just above the eyes in front, and the other below the occipital protuberance or "bump" on the back of the head, and to the opposite temple; at this point the hands of the operator change rollers and return them to the compress, over which they form a knot by twisting and changing their direction, one roller being carried over the top of the head and the other beneath the chin, and then meeting at the opposite side. At this point the rollers are again changed and returned to the compress, over which a second knot or twist is made in the same manner; two or three knots over the compress are usually sufficient to arrest the hemorrhage.

Two three ounce tubes of 3 per cent bicarbonate of soda in petrolatum.
One three inch by ten yards roll of gauze bandage.
One two inch by ten yards roll of gauze bandage.
Two one inch by ten yards rolls of gauze bandage.
One medicine glass.
Three drinking cups (paper), to be used once only.
One teaspoon.
One eye dropper.
One pair 4½ inch scissors.
One dozen assorted safety pins.
One one ounce jar of green soap, to cleanse hands.
One basin, enameled, or nonrustable metal.
One-half pint of grain alcohol.

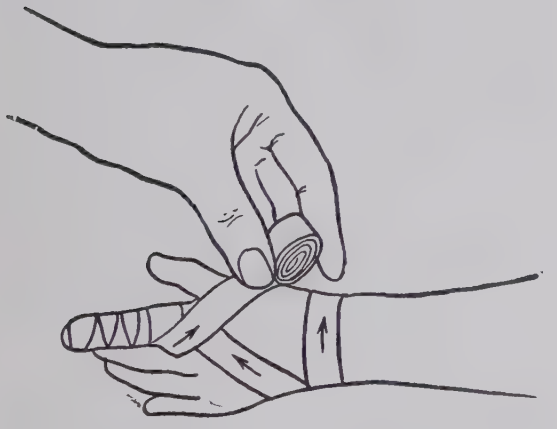


FIG. 344.—FIGURE OF EIGHT OF THE HAND. Arrow indicates route taken by bandage roll.

FIG. 345.—CRAVAT BANDAGE FOR HAND.

Six paraffin envelopes, each containing 6 x 36 inches of sterilized gauze, dressings for wounds, burns, etc.

One yard of 24 inch canton flannel, to make triangular slings.

One one inch by five yards spool of adhesive plaster.

One rubber tourniquet, 24 x ½ inch, or of webbing about 24 x 1 inch, to control hemorrhage.

Two splints, 30 x 4 x 3-16 inch, whitewood, and one wire gauze splint, about 30 x 4 inches, for fractures.

The National Founders' Association, 20 South La Salle Street, Chicago, counseling with other manufacturers, has adopted the following for its standard package:

One tourniquet.
One pair of nickel plated scissors.
One pair of nickel plated tweezers.
One triangular sling.
One wire gauze splint.
Twelve assorted safety pins.

One two ounce bottle of castor oil.
Two three ounce tubes of burn ointment.
One two ounce bottle of 3 per cent alcoholic iodin.
One two ounce bottle of white wine vinegar.
One two ounce bottle of 4 per cent aqueous boric acid.
One two ounce bottle of aromatic spirits of ammonia.
One two ounce bottle of Jamaica ginger (or substitute).
One piece of flannel, 24 x 36 inches.

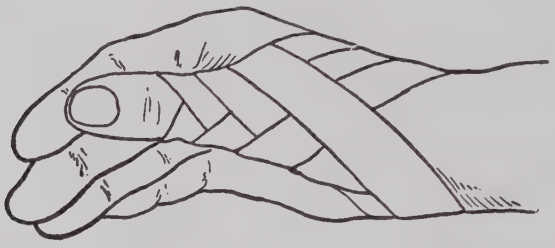


FIG. 346.—ADHESIVE PLASTER FOR SPRAIN OF THE THUMB.

One roll of absorbent cotton (1.5 ounce).
One roll three inch by ten yards of gauze bandage.
One roll two inch by ten yards of gauze bandage.
One spool one inch by five yards of adhesive plaster.
Six packages 6 x 36 inches of sterile gauze.
One teaspoon.
One metal cup.
Two medicine droppers.
Three paper drinking cups.
First aid record cards.

FIRST AID OUTFITS

Arlington, Massachusetts, now requires that every shop or factory where machinery is used for manufacturing purposes be equipped with a first aid outfit. In that city the Board of Health has the power to fix requirements of this character and their rules shall have the same standing as do ordinances by city councils.

The rule is as follows: Every person, firm, or corporation operating a factory or shop in which machinery is used for any manufacturing purpose, or for any other purpose except for elevators, or for heating, or hoisting apparatus, shall at all times keep and maintain free of expense to the employees a full set of the following articles, the same to be kept in a suitable dust-proof case:

Adhesive plaster, 1 inch roll and 2 inch roll.
Bandages, 2 dozen assorted, sizes 1 to 4 inches.
Absorbent cotton, 1 pound.

Gauze, 1 package of ten yards.
Elastic tourniquet, 24 inches.
Safety pins, 2 dozen.
Splint material, 4 white wood strips, 30 x 4 x 3-15.

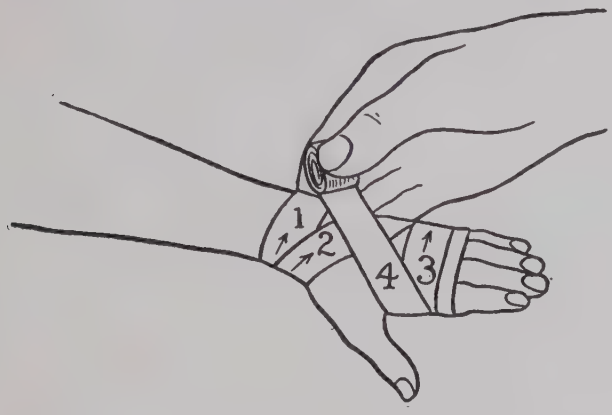


FIG. 347.—BANDAGING WRIST AND HAND. Numbers indicate route of bandage.

Scissors, straight, 3 inch blade.
Basin, enamel.
Tablets, corrosive sublimate and citric acid, 100.
Carron oil, 1 quart.
Aromatic spirits of ammonia, 4 ounces.
There are many first aid outfits now on the market. This would be a good

FIG. 348.—SPIRAL REVERSE BANDAGE.

one. The New York health department would modify it by omitting the carron oil and specifying that the gauze and cotton should be in small packages.

Carron oil is a poor dressing for burns. It is dirty, it is apt to spread infection; it should be omitted.

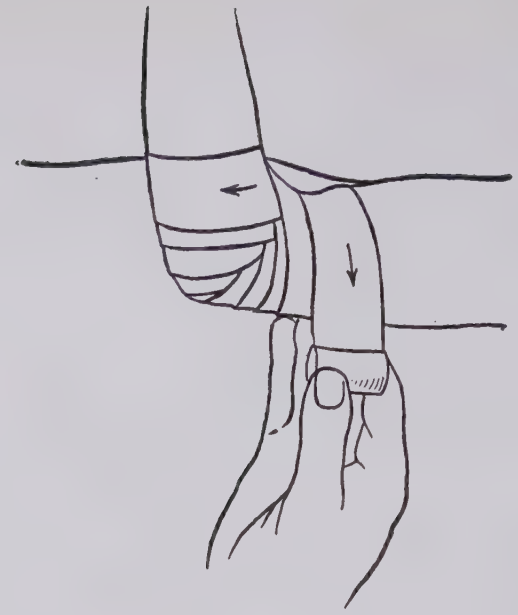


FIG. 349.—BANDAGING ELBOW.

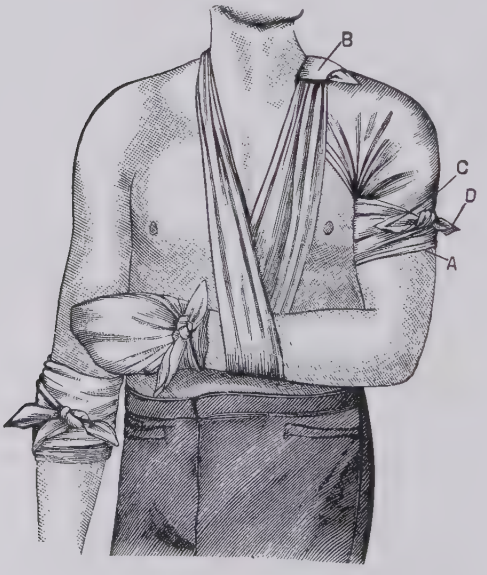


FIG. 350.—TRIANGULAR BANDAGE APPLIED TO SHOULDER, HAND AND ELBOW. *Shoulder:* The triangle should be applied to the shoulder by placing the base A downward across the middle of the arm, the apex B being turned upward against the neck. The basal ends C and D are carried to the inner side of the arm, crossed and returned to the outside and fastened. The apex B is tied or pinned to a cravat or sling placed round the neck. *Hand:* In injury to the posterior part, or dorsum, the hand may be bandaged by placing the base of the triangle *A* upward at the back part of the wrist, the hand lying on the bandage; the apex *B* is turned over the fingers upon the palm and carried to the wrist; the basal ends *C* and *D* are then carried to the front and crossed, and returned to the back of the wrist and tied, or crossed again, and tied in front. In injury to the palmar surface of the hand, the base should be first applied to the front of the wrist. *Chest:* The triangular bandage is applied by placing the base *A* downward across the lower border of the chest, with the apex *B* over the shoulder of the affected side, the basal ends *C* and *D* being carried around the sides of the back, and tied together in such a manner that one end of the knot is longer than the other. The long end is then tied to the apex, which has been carried over the shoulder.

The object in specifying that the gauze and cotton be divided among small packages is that the entire amount may not be soiled when first used.

In addition to the first aid cabinet a factory equipment could very well include a few simple remedies. Massachusetts requires this. Moreover, there are laws requiring that certain industries in which the workers are exposed to certain poisons shall carry the antidotes for those poisons in convenient accessible cases.

A medicine chest should include at least the following:

Medicine glass—two ounces.
Droppers—two.
Aromatic spirits of ammonia—four ounces.
Salts—one pound.
Cathartic pills—one hundred.
Vaselin—one dozen boxes.
Laudanum—two ounces.
Diarrhea mixture—four ounces.
Oil of cloves—one ounce (for toothache).
Sirup of ipecac—two ounces.
Limewater—one quart.
Mustard—one pound.
Bicarbonate of soda — half pound.

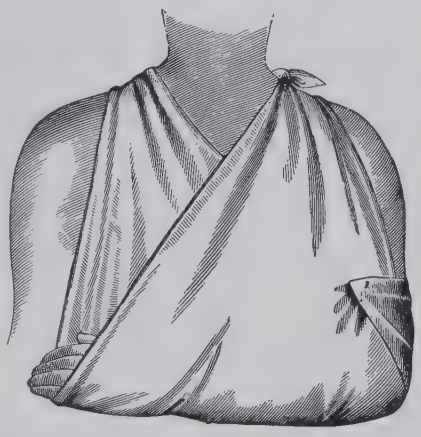


FIG. 351.—TRIANGULAR BANDAGE USED FOR ARM SLING. The base is placed vertically along the outer border of the right side of the chest, with the basal end thrown over the right shoulder, and the apex is placed behind the left elbow, the left arm being bent at a right angle and held in front of the bandage. The other basal end is now carried around the forearm and over the left shoulder, and tied to the first basal end at the back of the neck. The apex is then carried around the elbow and pinned to the bandage in front.

POISONS AND ANTIDOTES

In a case of poisoning the need is for quick action. A physician should be summoned at once; but to wait for his coming before getting into action might be a fatal mistake.

The first procedure whenever the poison has been taken into the stomach is to produce vomiting. Frequently a lot of time is lost in hunting up emetics. Vomiting should be stimulated by tickling the throat. If a feather or straw is handy use that; if not, use the finger.

In the meanwhile someone should be preparing some lukewarm salt water or mustard water. No time should be wasted on accurate dosage, as the water is to come up again anyhow.

When the physician comes he will give apomorphia hypodermically, and in most cases he will use the stomach pump. In some cases a stomach pump will be available before the doctor comes. The most satisfactory stomach pump is the simple kind consisting of a tube and a funnel.

To operate a stomach pump the end of the tube is introduced into the mouth, pushed to the fauces, and the patient is told to swallow. As he swallows the tube is pushed gently. The patient swallows the tube just as he swallows food. Pushing on the tube may help or it may interfere. The

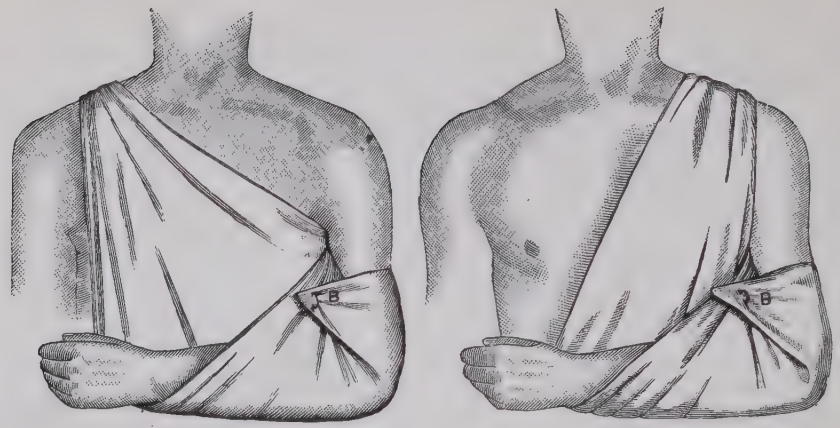


FIG. 352.—TRIANGULAR BANDAGES USED FOR ARM SLINGS. The bandage is to be applied in a manner similar to Fig. 351, with this exception—instead of the second basal end being carried over the left shoulder, it is carried under the left arm, then upward across the back, and tied to the first basal end over the right shoulder. If the right shoulder or clavicular region be injured as well as the left arm, the latter can be placed in a sling, leaving the affected shoulder (the right) uncovered by laying the first basal end over the left shoulder, the base being carried from above obliquely downward and to the right, the apex of the bandage and the arm being in the same position as in the slings just enumerated. The second basal end is now carried under the left arm and upward over the back, and tied to the first basal end at the left shoulder.

essential part of the proceeding is the swallowing, not the pushing. The head must be bent forward slightly else the tube cannot be swallowed.

FIG. 353.—TRIANGULAR BANDAGE FOR COLLAR-BONE FRACTURE.

FIG. 354.—DRESSING FOR COLLAR-BONE FRACTURE.

The tube having been swallowed, the salt water is poured into the funnel. After a fair quantity has been run in the funnel should be rapidly lowered

and the stomach contents siphoned out. This should be repeated several times.

FIG. 355.—TRIANGULAR BANDAGE OF BREAST.

Acetanilid, Antipyrin, Antifebrin (Headache Medicines).—*Antagonists:* heat externally; coffee; aromatic spirits of ammonia—teaspoonful in half a glass of water.

FIG. 356.—FIGURE-OF-EIGHT SPICA BANDAGE OF SHOULDER. Numbers indicate route of bandage.

Acetic Acid.—*Antidotes:* whitewash from the wall; soap; chalk; lime-water; magnesia.

FIG. 357.—TEMPORARY DRESSING FOR FRACTURE OF CLAVICLE

FIG. 358.—STRAPPING WITH ADHESIVE PLASTER FOR BROKEN RIB.

Arsenic.—*Antidote:* hydrated oxid of iron with magnesia.

Alkalies (Such as Lye, Washing Powders, Etc.).—*Antidotes:* vine-

FIG. 359.—CRAVAT BANDAGE FOR KNEE.

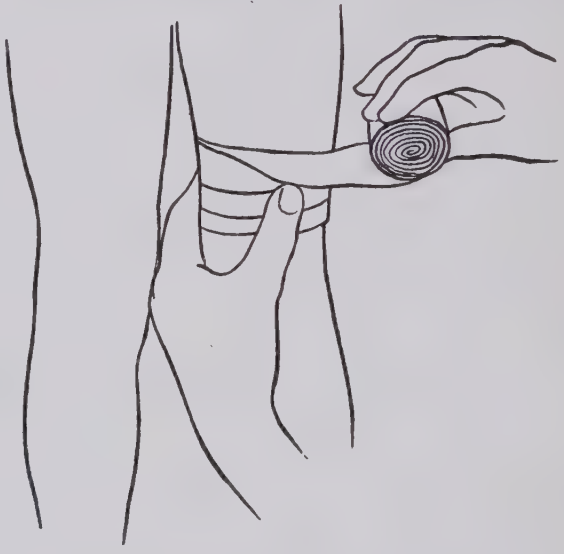


FIG. 360.—SPIRAL REVERSE BANDAGE OF THIGH SHOWING INTRODUCTION OF THE FIRST REVERSE.

gar; lemon juice; albumin; milk; gelatin; oils. (Potter says never use the stomach pump.)

Alkaloids (General).—(Morphin, atropin, strychnin, quinin are illus-

trations of alkaloids.) *Antidotes:* tannin, half a teaspoonful in water; potassium permanganate, five grains in water, freshly mixed; borax in milk, twenty-five grains to the ounce; charcoal—empty the stomach immediately. Wash it out after the antidote has been given.

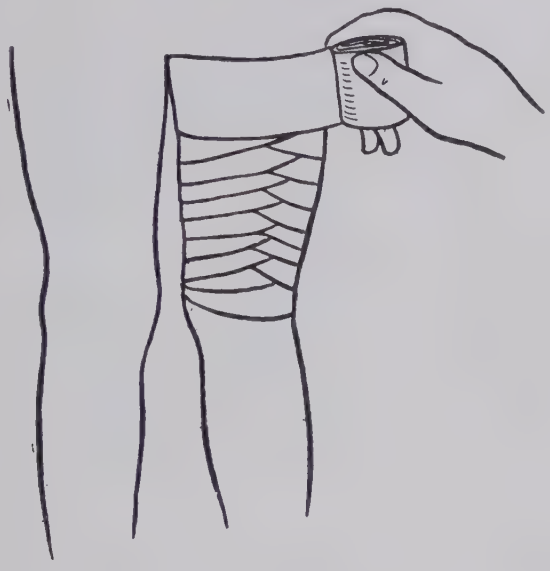


Fig. 361.—Spiral Reverse Bandage of Thigh Completed.

Ammonia (Smelling Salts, Hartshorn).—*Antidotes:* vinegar; lemon juice; orange juice.

Bichlorid of Mercury.—*Antidotes:* white of egg, one white for each four grains of poison. Stomach should be emptied at once as the albuminate

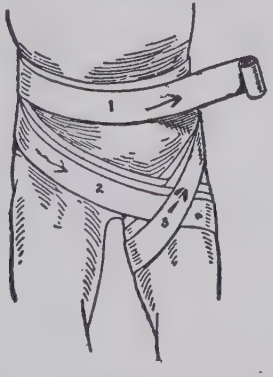


Fig. 362.—Bandaging Hip and Abdomen. Numbers indicate route of bandage.

of mercury is soluble in the alkaline content of the stomach. An excess of albumin puts the mercury back into solution. Iodid of potassium should be given carefully for several days after the poison as it assists the kidneys in getting rid of the mercury.

When other means are not available or practical in cases of poisoning drug or nourishment is given by rectal injection. In these cases the solution should be warmed and at least one-third more given than when taken by the mouth. The ordinary household syringe should be used and care should

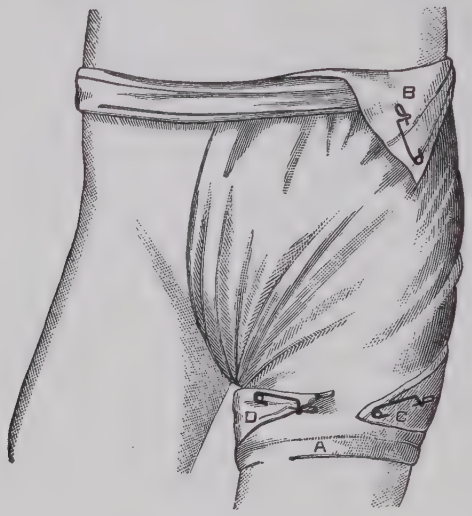


FIG. 363.—TRIANGLE BANDAGE ON HIP. The triangular bandage at this portion of the body is applied in very much the same way as at the shoulder. The center of the base *A* is placed downward across the middle of the thigh, the apex *B* being carried upward above the crest or upper border of the pelvis or haunch-bone, the basal ends (*C* and *D*) are carried around the thigh, and fastened at the outside. The apex *B* is attached above to a cravat around the waist.

be taken that the air in the syringe is expelled before the pipe is introduced.

In the absence of a stomach pump the rubber tube of an ordinary fountain syringe can be used by cutting off the rubber or metal end. The bag takes the place of the funnel of the regulation stomach pump.

When corrosives have been taken a stomach pump should not be used as the membrane is usually swollen.

Cannabis Indica—Hashish.—*Antidote:* lemon juice from time to time. There is no record of death from hashish poisoning.

Carbolic Acid.—*Antidotes:* wash out the stomach with equal parts of alcohol and water. Leave about half a pint of the mixture in the stomach for a few minutes, then wash out with warm water. If the case is first seen some time after the poison has been taken give an ounce of Epsom salts or half an ounce of Glauber's salts. Vinegar; soapsuds.

Chloral Hydrate.—*Antidote:* two teaspoonfuls of the official solution of hydroxid of potash to be taken well diluted every hour for several hours.

Chloroform (Internally).—*Antidotes:* sodium carbonate, half a teaspoonful in plenty of water; pint of coffee by rectal injection; hot water bottle to the extremities.

Coal Oil (Kerosene, Gasoline).—*Antidote:* wash out the stomach with warm milk. If a stomach pump is not at hand give a quart of milk and then produce vomiting.

Cocain.—*Antidotes:* if the drug has been swallowed give a fresh solution of permanganate of potash. If it has been taken hypodermically give morphin or chloral. Stimulate.

Cyanid of Potassium.—*Antidotes:* where factories use cyanid of potash they should keep the following stock solutions on hand: solution of ferrous sulphate, 3 per cent, one ounce; solution of potassium hydroxid, 5 per cent, one ounce. Keep these solutions in separate bottles. To use, mix, add two or three grains of calcined magnesia and a pint of water. Give the mixture, wait ten minutes and then wash out the stomach. *Other antidotes:* cobaltous nitrate; hyposulphite of soda; bleaching powder in weak solution in water.

Formaldehyd.—*Antidote:* ammonia. In case the gas is objectionable sprinkle ammonia around. When the gas has been inhaled heat some water

FIG. 364.—GOOD METHOD OF STRAPPING A SPRAINED ANKLE WITH ADHESIVE PLASTER.

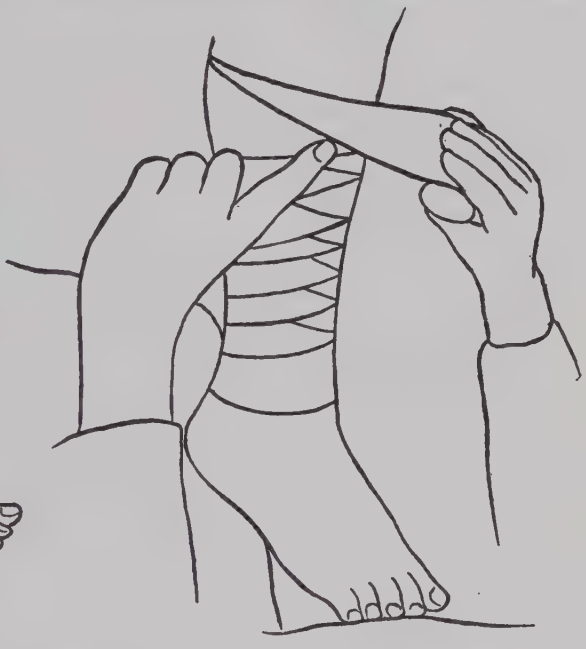


FIG. 365.—BANDAGING LEG. SPIRAL REVERSE.

of ammonia diluted with two parts of water and inhale the steam cautiously. If the formalin has been taken internally give aromatic spirits of ammonia, a teaspoonful in a glass of water.

Gas, Illuminating.—*Antidotes:* inhalations of a spray of chlorin water; oxygen by inhalation; artificial respiration should be kept up several hours if necessary.

Headache Medicines (See Acetanilid).

Hypochlorite (Bleaching Powder).—*Antidote:* hyposulphite of soda, fifteen grains in water every hour for several doses.

Iodin.—*Antidote:* starch, teaspoonful washed down with water.

Lead Salts.—*Antidote:* Epsom salts, teaspoonful in water. Repeat in an hour. Produce vomiting.

Lead Colic.—To a pint of boiling milk add ninety grains of alum. Give a wineglassful every hour or two.

Matches (See Phosphorus).

Mineral Acids (Muriatic, Nitric, Sulphuric, and Some Others).—*Antidotes:* whitewash; wall plaster; chalk; soapsuds; magnesia; cooking soda. (Potter advises against the use of the stomach pump because of the liability of puncturing the stomach.)

Morphin (See Opium).

Mushrooms, Poisonous.—*Antidote:* give atropin sulphate. Do not give more than one dose of 1/100 of a grain before the physician takes charge.

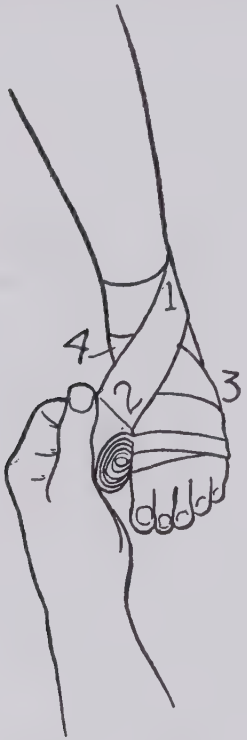


FIG. 366. — FIGURE-OF-EIGHT BANDAGE OF THE ANKLE AND FOOT. Numbers indicate route taken by bandage.

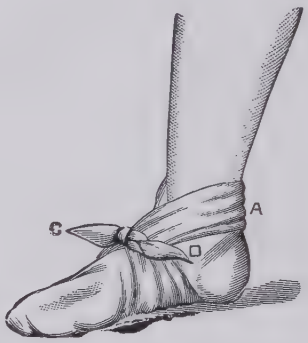


FIG. 367.—TRIANGLE BANDAGE ON FOOT. The foot should be placed on the triangle with the base *A* backward, and laid behind the ankle, the apex being carried upward over the dorsum or top of the foot. The basal ends *C* and *D* are brought forward, crossed, then carried around the foot, and tied on top.

FIG. 368.—REEF KNOT.

Opium (Morphin).—*Antidotes:* a third of a spoonful of tannin dissolved in water, or wash out the stomach with a 1 per cent solution of potassium permanganate. Leave some in the stomach. Borax (5 per cent) in milk. Coffee by the rectum.

Oxalic Acid (Salts of Lemon, Ink Eradicator).—*Antidotes:* wall plaster; whitewash; limewater; chalk; ink; magnesia. (Potter, from whose therapeutics most of this information is drawn, says: "Avoid cooking soda, since it forms compounds as toxic as the acid itself. Never use the stomach pump.")

Prussic Acid.—*Antidotes:* cobalt nitrite; hyposulphate of soda; give inhalation of ammonia.

Phosphorus (Matches; Some Rat Pastes).—*Antidotes:* wash out the stomach with a 1 per cent solution of permanganate of potash. Leave some in the stomach. Limewater; charcoal; hydrated magnesia.

A poison case should contain the following substances properly labeled: Borax; bicarbonate of soda; limewater; charcoal; common salt; calcined magnesia; permanganate of potash; hyposulphite of soda; starch; sulphate of magnesia; tannin; solution of ferric sulphate, 600 grains in 4 ounces of water; magnesia, 150 grains in a pint and a half of water; nitrate; hypodermic syringe and pellets of apomorphin muriate; strychnin and morphin sulphates; stomach pump.

Martindale's antidote bag: dialyzed iron; sirup of chloral; chloroform; spirits of chloroform; magnesia; spirits of ammonia aromatic; oil of turpentine; acetic acid; tincture of digitalis; tannic acid; amyl nitrite; zinc sulphate; Ipecac; bromid of potash; permanganate of potash; solution of ferric sulphite, 40 cc. in 125 cc. of water; magnesia in solution, 10 grains in 750 cc. water in a bottle 1,000 cc. capacity; mix and make official antidote for arsenic. Hypodermic syringe and morphin, atropin, apomorphin, pilocarpin and strychnin.

FIG. 369.—GRANNIE KNOTS.

Poison Oak Treatment.—*B. H. M. writes: "What is the best remedy for poison oak? Why does it break out again every year about the same time?"*

REPLY.—One attack of poison oak dermatitis makes the skin more sensitive to the poison. The poison does not stay in the system between attacks. There is a contact with the vine before every attack. Bathe the poisoned parts with hot water, and dry carefully. Spread ichthyol ointment [10 per cent] on sterilized gauze and bandage loosely or strap with adhesive plaster. Dressing should be changed twice daily. If the face is poisoned make a mask of gauze, cutting holes for the eyes, nose and mouth.

Alcohol and Snake Bite.—*Mrs. W. F. V. writes: "Is an alcoholic stimulant the best remedy for snake bite?"*

REPLY.—It is not. If a stimulant is needed aromatic spirits of ammonia is a better one.

Snake bite is rarely fatal. But few snakes are poisonous. Of the poisonous snakes few are capable of killing a grown person.

Alcohol has got the credit for curing a great many people who would

have become well without it and indeed have become well in spite of it. When a man has been bitten and is scared stiff alcohol gives him some Dutch courage. For this purpose morphin and hyoscin would be better.

Treatment of Wounds.—*S. B. C. writes: "We are being told on every side that we must not wash a wound with soap and water or antiseptic solutions lest the tissues be injured. You say iodin should be in the emergency kit, but you do not say how it should be used."*

Reply.—If a wound is greasy and dirty (shop wound) wash it out with gasoline. If the wound is through ordinarily clean skin wash around the wound with soap and water and follow with alcohol.

The iodin may be poured into the wound, or it may be applied to the wound with an applicator made with a toothpick and a bit of absorbent cotton. If the iodin runs over the sound skin that excess should be washed off with alcohol. Then cover the wound with a small amount of gauze. Hold the gauze in place by a light bandage. Do not seal out the air with collodion.

Where wounds are stinking, suppurating with decomposing secretions, such as are the neglected wounds of the European war, the best treatment is to clean with peroxid of hydrogen and to apply very light open gauze dressings. Such wounds need oxygen and air.

Toxemia.—*F. L. B. writes: "1. What would produce toxemia in a child? 2. What would cause toxemic poisoning? 3. With proper care would the prognosis be favorable? 4. Should a relapse or second attack of poisoning be feared, if so from what cause?"*

Reply.—Toxemia merely means that there is a poisonous substance in the blood. What would cause it, whether a given case would get well and whether it will recur depend on what the nature of the poison is and some other factors. For instance, a child eats spoiled food. Some of the harmful substance is absorbed, some goes to the brain and causes fever, some to the skin and causes a rash. If the child vomits and purges before much poison has been absorbed it should get well. The toxemia will not return unless the child again eats spoiled food.

CHAPTER XLVII

Occupational Diseases

When human slavery was abolished employers became careless of workers. Any sort of a hole would do for a servant's room; employees were worked until they fell; accidents were inevitable; lead poisoning was unfortunate but unavoidable and consumption was a visitation of Providence. Now we recognize industry as social. It is no longer the business of the employer alone.

First, the government came around sticking its nose into interstate commerce. There was a great outcry from the railroads but the measures stuck. Then came regulation of public and semi-public utilities. Then came the government sticking its nose into private business looking for combinations in restraint of trade, for unfair competition, for dishonesty of many sorts including cheating by substituting fakes or impurities for food and by lying labels. Finally, the socializing process is extending to movements for the prevention of accidents, trade poisoning and occupational disease.

This preventive movement is being fairly well received by legislative bodies, employers and employees. Each complains a little but as I see it there is no great amount of justification for it. Probably the reason is that the educational work has been well done. John Calder said:

"Legal obligation to safeguard thoroughly has only succeeded where persuasion and enlightenment have accompanied it."

The American Red Cross from time to time issues pamphlets telling how to prevent injurious industrial conditions. It distributes wall cards telling what to do in case of accident or poisoning. There are several organizations doing similar work. In consequence many places of business now contain first aid cabinets distributed at convenient points around the factory. Some have first aid corps that have a certain amount of training in the accidents liable to occur in the various factories.

Some have emergency hospitals. I know of a few large plants with a large amount of floor space under cover where there are complete motorcycle ambulance systems. But the majority of the plants have not developed anything of this character. They are not large enough to warrant the necessary organization. These should at least have cards of instruction prominently displayed and first aid cabinets containing antidotes for poisons and surgical dressings.

The Illinois Commission on Occupational Diseases found in Illinois seventy industrial processes which are productive of lead poisoning. Sixty-three out of 89 brass foundries were acknowledged centers of trade sickness. Of 187 men examined 164 were found to be suffering from brass poisoning. Out of 1,760 men examined only 17 were over fifty years of age and only 180 were over forty.

The commission examined 240 men employed in steel mills and subjected to carbon monoxid gas. Practically all of them were in bad physical condition but the commission found it difficult to say whether the cause was carbon monoxid in the works or factors outside. Among other things they noticed a loss in muscular power and a sluggish mentality. The relation of carbon monoxid poisoning to these changes should be investigated.

Few people understand how many industries make use of poisonous metals and therefore subject their workers to poisoning. Some of those using lead are: painting, enameling, glass making, file making, kitchen tinware, pottery, india rubber, plumbing, milk bottle covers, electric cables, storage batteries, dry sandpapering of lead paint and those processes which make use of phosphorus.

I would suggest reading of Dr. Alice Hamilton's address as printed in *Human Engineering* for 1911 if for no other reason than it shows how little employers know about the conditions of their men. I have reference not so much to the philanthropic side as to the premature senility, loss of muscular strength and mental tone, incapacity from illness in their workers —expenses which the employer unconsciously carries in part.

Acid Burns

A manufacturer wrote me a short time ago about hydrofluoric acid burns in his factory. His letter has prompted this article. Hydrofluoric acid is used for cutting glass. The fumes irritate the breathing apparatus and the eyes. When the solutions of acid get on the hands they make deep burns which heal slowly. A milder effect is a chronic inflammation of the skin—a dermatitis.

For the removal of the fumes hoods should be placed over all vats and ventilating fans should draw the fumes into these hoods under strong draft. The eyes should be protected by celluloid goggles, the hands by rubber gloves. These are the recommendations of the Illinois Commission on Industrial Diseases. If the worker gets a dermatitis from rubber gloves, as some do, he can keep his hands covered with grease and then wear a pair of well greased cotton gloves.

A factory using hydrofluoric acid should have easily available facilities for hand washing. When acid splashes on the skin it should be washed off with plain water and then silicon or sand should be applied. This should be washed off later and the burn treated like any other burn.

With other forms of mineral acid poisoning, wherever in the process fumes are given off (including those processes where liquids are so heated as to cause steam to rise) the fumes should be collected by hoods from which the air is drawn by fans. If this does not suffice the men should be provided with respirators. Goggles should be used to protect the eyes. When acid gets on the skin it should be quickly washed off with water. Alkali, such as baking soda, should be at hand and some of this should be dusted on as soon as the excess of acid is washed off. The burns should then be treated as are other burns.

In trades where alkali is used the fumes must be carried away. When alkali has got on the skin it should be washed off with plain water and then

with a weak acid. Watery solution of mineral acids should be kept at hand but in their absence vinegar can be used.

Workers with chromic acid and bichromate not infrequently suffer from poisoning of the skin with these substances. Sometimes the acid is strong and deep burns resulting in chronic ulcers develop. To prevent this facilities for washing with soap and water should be provided.

More frequently the effect is a chronic eczema. To prevent this the hands should be washed with an aluminum sulphate solution (8 per cent), one ounce in one pint of water. They should then be greased with a fresh cold cream or with fresh lard. While at work rubber gloves should be worn.

PHOSPHORUS POISONING

One of the most interesting papers read at the International Congress on Hygiene was one by Sir Thomas Oliver on industrial diseases. In the course of his lecture he complimented the United States upon the passage of the bill to prevent the use of poisonous forms of phosphorus in the manufacture of matches.

According to Sir Thomas, when students of occupational diseases discovered the horrible effects of phosphorus upon the matchmakers they recommended sanitary shop regulations thinking in this way to prevent phosphorus poisoning. Many governments embodied such regulations in their laws and many factories installed such provisions as a part of their shop practice. Nevertheless phosphorus poisoning was about as frequent and as horrible as before the regulations were enforced.

Sir Thomas showed many lantern slides illustrating horrible deformity amongst match workers. One poor fellow lost half of his upper jaw and then, instead of taking up farming, he went back into the factory, was again poisoned and lost his entire lower jaw.

In 1872 Finland prohibited the use of poisonous kinds of phosphorus in matches. In 1874 Denmark likewise prohibited the manufacture of matches with dangerous kinds of phosphorus. In 1906 the International Association for Labor Legislation meeting at Berne proposed an international treaty agreement for the prevention of the use of white phosphorus in making matches. Certain manufacturers opposed the change saying the cost of manufacture would be prohibitively high, the matches would not keep, the matches would not be as good—the change was not feasible commercially.

As soon as the recommendation was made by the congress Denmark signed the treaty, France signed in 1906, so did Switzerland, Holland, Luxemburg, Italy and Germany. Austria complied in 1908 and England in 1910.

Contrary to the opinion of the objectors Sir Thomas Oliver said the law had not been found objectionable from any business standpoint and it has done away with phosphorus poisoning among the workmen.

When the bill came up in Congress it was proved that phosphorus poisoning in this country was frequent and severe. The Diamond Match Company came forward with an offer to give the method of manufacture of harmless phosphorus to whomever wanted it. The law gave plenty of time for everybody to adjust his business to the new requirement. There remained not

a single business objection, while, on the other hand, there was the offer of safety for the workingman. Finally the bill was pried out of the pigeonhole and passed. The president signed it and before many months this republic was protecting matchmaker citizens as well as most European countries do.

ACCIDENTS AND DISEASES OF IRONWORKERS

Such was the title of a paper by Dr. Röpke of Sölingen, Germany. Ironworkers, especially workers in raw iron, have a great many accidents and contrary to what one would think mechanical accidents are more frequent than scalds and burns. Their disease rates are also higher than normal.

In raw iron work the men are poisoned by the gases, vapors and dust. When air passes over red hot iron it has a burnt odor and it does harm. That we have noticed in houses heated with stoves and hot air furnaces. Part of the cause is the charring of dust and bacteria; part of it is carbon monoxid gas. If the structures are inclosed enough to allow it to accumulate this gas abounds in foundries and rolling mills.

In what he terms the small iron industry the harm, in the main, is from dust.

1. Blacksmiths suffer from coal dust, coal vapor, from sudden changes in temperature and from overwork. The reader will note the distinction between the effects of coal dust and smoke and vapor—a distinction usually lost sight of by our anti-smoke nuisance friends.

2. The locksmith trade is not a dusty one. The workmen develop curvature of the spine from sitting in bad positions for long stretches.

3. File cutters also develop stoops and postures from working at badly placed benches. They suffer from lead poisoning occasionally. Their consumption rate is rather excessive.

4. The grinders suffer heavily from the dust diseases. They lead the list of consumptives. Röpke found that ironworkers had more than their share of eczema and boils.

Galvanizers were especially subject to eczema. They were nearly always deaf after working one year in a noisy shop. They had an excessive amount of consumption. Though pneumonia and colds were frequent their rise did not keep pace with that in consumption.

The author lays this down as a basic proposition: *"The state, the community, and the employer all have the same interest at heart—to keep the ironworker in good health."* Nor does he neglect to emphasize the obligation of the ironworker to keep in good health. A part of the protection is properly the duty of the employer. A part of it is the duty of the employee.

The basic principle of the method laid down is: "Dust and gases must be rendered innocuous at the place of their origin." And, again, the almost universal note of optimism: "The mortality rate among metal grinders at Sölingen is much lower than in the good old days."

REMEDY FOR THE "GASSED"

One of the least suspected sources of poison is the fumes of wood alcohol. Wood alcohol is used to cut shellac and other varnishes. It is used in some

rapid drying paints. It forms the basis of liniments and is used to cut oils. The alcohol vaporizes readily and the air of closed rooms becomes saturated with it. When a man has soaked up much of it he is liable to die suddenly in coma.

If he recovers from the first effects he may become pale and anemic, develop crops of boils, and in time go blind. The blindness from wood alcohol poisoning is hopeless because the nerve of sight is destroyed.

The preventive is good ventilation. If a few electric fans were properly distributed around the beer vats which are being varnished the poisoning would be negligible. The remedy is to take the stricken person into the fresh air.

Workers at vulcanizing of rubber get jagged from the fumes of the hydrogen sulphid inhaled. An acute insanity with destructive tendencies, even with a tendency to self-destruction, sometimes develops. In chronic poisoning a peripheral neuritis is developed. Some of the nerves become chronically inflamed and after months of pain the muscles supplied by the painful nerve begin to shrivel.

The remedy is to provide the workshop with good ventilation, with hoods and exhaust fans to draw the gases as directly as possible. The best of bathing facilities should be provided. The workers should be provided with working clothes that their street clothes may not be saturated with the foul odors of the work place. Outside eating rooms should be provided. Young persons should not work at this trade. The hours of work should be short.

When a person is "gassed" the remedy is inhalation of oxygen.

A frequent form of gas poisoning is that due to carbon monoxid. Blast gas contains 26 per cent and producer gas 23 per cent of this highly poisonous gas. It is found around steel mills, gas plants and coke ovens. It is even present in such places as rooms heated by stoves and tailor shops with their coke fires and irons.

The workers get into an intoxicated condition which they speak of as being "gassed." Later effects are insanity and anemia. A striking result is a loss of power in the muscles.

The remedy for the acute condition is oxygen gas.

To prevent the condition the places should be well ventilated. Drinkers should not be allowed to work around blast furnaces, rolling mills or gas works. Oxygen should be kept at hand.

LEAD POISONING

A mother expects her baby under two years old to have diarrhea occasionally but when her older children get it she wonders why. She is pretty certain to accuse them of eating green fruit or spoiled fruit or something else forbidden. Every now and then the children get such attacks and occasionally the cramping is so great that a physician is called in. If he be a bright, quick witted chap he is likely to suspect lead poisoning. If he turns about a bit he will find several ways in which children can get hold of lead without knowing it—for instance, from soda water and pop. Every "kid" likes them.

Soda water and pop are mixtures of plain water and carbonic acid. Carbonic acid dissolves lead wherever it touches it. Lead pipes make the best

and also the cheapest connections for soda fountains and pop machines. Block tin pipes or chemically pure lead pipes are much more expensive and less well adapted to bottled water work than those made of ordinary everyday lead.

Pop or soda water that touches ordinary lead gets a small charge of lead, not enough so that one bottle of pop or one glass of soda will kill a child but just enough to give a child who drinks two or three glasses of soda or two or three bottles of pop a week spells of diarrhea and frequent cramps in the legs, arms and belly in a few weeks. If the poisoning is worse the child may be having convulsions or be pale or have a blue line along the gums—occasionally paralysis of a leg or arm will develop.

The preventive remedy is simple. Allow the child to drink no soda water except from fountains which advertise "No lead in our soda"; to drink no pop unless "No lead in this water" is blown in the bottle.

FIG. 370.—WRIST DROP DUE TO LEAD POISONING.

Lots of grown people are suffering from lead poisoning. They do not know it, which only makes it worse. The report of the Illinois Commission on Industrial Diseases proves that many suffer from lead poisoning and also that most sufferers wonder what the trouble is. The symptoms of lead poisoning in grown people are much the same as in children.

When a grown person has a persisting diarrhea there is a reason and the reason may be lead poisoning. However, in grown people, as you would expect, diarrhea is not so prominent a symptom as in children. The cramps, the paralysis, the pallor, the blue gum line become more important signs.

Of course, every painter knows he is in danger but there are many other trades in which some lead as dust or smear gets on the hands; the worker fails to wash his hands before taking a chew of tobacco or eating his meals, or drinking water or beer or doing any one of a dozen acts that everyone does almost unconsciously but which serve to carry just a little lead to the mouth. If the amount carried was great enough to knock the man right down he would not repeat the thoughtless act, but it is mighty hard to see the importance of a thing which does not show its importance until it has been kept up for half a year.

Among other workers who get lead poisoning are glaziers, plumbers, miners, workers in lead, file makers, gun polishers, tinware makers, weavers, typesetters and typemakers, rubber goods makers, structural iron workers, brass workers and lace-makers. Rather an extended assortment.

PREVENTING LEAD POISONING

Dr. Francis D. Patterson, having declared that industrial plumbism was preventable, gave the following twelve requirements by which a factory could prevent it:

"1. Taking care to make the processes as dust free as possible.

"2. As it has been found difficult to enforce the use of the ordinary type of respirators, we are using with success a respirator which I designed and have had manufactured by Johnson & Johnson. It is made of five thicknesses of gauze and they are issued clean to the men each day.

"3. But a slight amount of the lead dust which enters the mouth and nose passes into the lungs. Fully three-fourths of it lodges in the mouth and nose, where it becomes mixed with saliva and mucus and is unconsciously swallowed. In order to obviate this as much as possible it is our practice to require our employees before taking their dinner and when cleaning up after the day's work to thoroughly wash out the nares with warm water and to gargle the throat and wash the mouth thoroughly with a 0.2 per cent solution of sulphite of soda.

"4. Each factory should have a room, preferably in a separate building, where the employees eat, and no food should be allowed to be carried into any other room in the factory. Care should also be taken to see that the employees wash properly before eating their dinner.

"5. Milk being a valuable preventive, it should be provided at the company's expense and the employees urged to drink it freely.

"6. All employees should be provided with clean overalls each week at the company's expense.

"7. Ample facilities for bathing with soap and towels should be provided.

"8. The carrying and the chewing of tobacco at work should be prohibited.

"9. Too much stress cannot be laid upon the importance of the employment of a competent physician, who will make a physical examination of all applicants for employment and reëxamine the employees at a weekly interval. We do not employ any men under the age of 21 years, nor those who present the physical evidences or history of alcoholism, kidney disease, syphilis, rheumatism, or any chronic digestive disturbance.

"10. Each employee receives a thorough physical examination each week, so as to determine those who present the evidences of being in a condition of "lead store." The recognition of this in its incipiency and the administration of the proper treatment insure the relief of the condition before it has time to progress.

"11. All employees are given free medical treatment; they are encouraged to consult me for any ailment, no matter how trivial, and this further insures the early recognition of any cases of poisoning.

"12. In each room in the factory is a notice which tells the employees of the precautions which they should take in assisting in preventing lead poisoning among them."

RECOGNIZING LEAD POISONING

A great many people suffer from lead poisoning. Some recognize the condition readily. Some suffer for a long time without knowing it. The Illinois state factory inspector reports the following as the more important symptoms found in the poisoned workers coming under the observation of his department:

The most frequent notation is "blue line on gums," "lead line." The second most frequent notation is "colic," "umbilical cramps," "pain in the region of the umbilicus," "abdominal tenderness," "abdominal pain," "nau-

sea," "pallor." Next comes tremor. Other less frequent symptoms are paralysis, wrist drop, muscular weakness, dermatitis, constipation, headache and sore eyes.

These are the more immediate effects of lead poisoning. The report does not refer to such delayed effects as high blood pressure, apoplexy, Bright's disease and premature senility.

The occupations in which there is especial tendency to poisoning from lead are several. The most dangerous of all trades from the standpoint of lead poisoning is painting. Among the employees of white lead manufactories the lead poisoning rate was about four per one thousand.

In the smelting and refining of lead conditions are improving rapidly. The lead poisoning rate among employees in 1914 was three per one thousand. In the paint and dry color factories there was considerable hazard. In the former it was found that the men would often eat without washing their hands. In the latter the danger from soiled by lead hands was augmented by the danger from lead dust.

Among workers in battery factories the number of cases of lead poisoning was high, about six per one thousand. The worst rate of all was in the tinware establishments. The lead sickness was eleven per one thousand.

Other dangerous trades are manufacturing car seals, electrotyping, enameling, brass foundry work, litho transfers, decalcomania work and galvanizing. In some of these trades the care taken is reducing the hazards to reasonable limits of safety. In some processes lead sulphate is being substituted for other forms of lead because of an opinion that lead sulphate is not poisonous. The Illinois officials found lead sulphate about as poisonous as other forms of the metal.

Painters using different forms of rapid dryers are subject to another form of poisoning. The evaporating solvent in these rapid dryers is either benzin or wood alcohol. Painters who use them are subject to vertigo, headache, nausea, and ringing in the ears. These symptoms are the same as are found often in garages and dry cleaning establishments. They are due to the fumes of benzin, petrol or wood alcohol.

To prevent lead poisoning it is necessary (1) to have ample washing facilities, (2) to require that the lunch be eaten outside the factories and that before eating the face and hands be washed, (3) to wear respirators in dusty places, (4) to use hoods and artificial ventilation wherever needed.

MERCURY POISONING

Both Professor Teleky of Vienna and Professor Tylecote of Manchester told the hygiene congress that acute mercury poisoning as a trade disease was becoming less but that there was an increase in chronic poisoning with mercury.

The use of mercury to gild mirrors has materially decreased. European mercury mining has been made safer. Fire gilding has been replaced by galvanic gilding. These industries caused the more acute forms of mercury poisoning. On the other hand, chronic mercury poisoning among hatmakers is on the increase.

The symptom which makes the hatmaker think there is something wrong is a fine tremor first appearing in the hands and then spreading to the body entire. The hand does not jerk so coarsely as it does in paralysis agitans or in disseminated sclerosis. It is a coarser jerk than the very fine tremor of goiter. Later it affects the speech and gait. The teeth turn black and some of them loosen and drop out though this symptom is not nearly so great as it is in the salivation from calomel which the older people remember.

Felt plankers' hands are cracked and calloused but this is from the acid in the bath more than from the mercury.

Tobacco chewers suffer more than men who do not chew. They get mercury on their hands, then on their tobacco and then into their mouths.

There is no special susceptibility to consumption.

The methods of prevention proposed applied, in the main, to hat factories, felt factories, and the places where pelts and fur were handled, cleaned, dyed, and worked. Workmen in such places should receive a monthly medical examination. No hat work should be done at home. Women and children should not be allowed to do hand planking. In fact, hand planking should be done away with. The factory should be spacious and well ventilated. The workers should have an average of 800 cubic feet of space each. The room must be frequently sprinkled. Every machine must be provided with a hood and a dust exhaust. Government inspectors must make periodic examinations of the air to keep down the amount of dust, and particularly mercury dust, it contains. As far as possible all hand processes must be supplanted by machines so as to keep the hands away from the mercury mixtures as much as possible and to keep the dust down to the minimum. There should be ample toilet facilities conveniently located and appealing to the esthetic sense.

ARSENIC AND BENZIN POISONING PREVENTION

Men who work in making and cleaning wallpaper, those who manufacture dyes and some workers at the manufacture of chemicals, suffer at times from arsenic poisoning. *Chronic arsenic poisoning causes the hair and nails to fall off and produces skin eruptions, bronchitis, bleeding gums, neuritis and Bright's disease. Acute arsenic poisoning causes violent vomiting and purging.*

To prevent chronic poisoning the general ventilation should be of the best. Where hoods and exhaust fans can produce results they should be made use of. Sometimes respirators should be used, and ample washing facilities must be provided.

As an antidote for acute poisoning with arsenic take white of egg, then produce vomiting; after that take milk.

People who work at the manufacture of celluloid articles develop cough, bring up bloody sputum and in time become asthmatic. The principal necessity is that there should be provision against fire. Fire apparatus, and especially fire smothering cloths and sand for the same purpose, should be kept at hand. The factory should be well ventilated.

Cleaners, dyers, and all others who work with benzin or similar substances are greatly hazarded by their occupation. To prevent explosions add a small

quantity of oil soap to the benzin (1/10 to 1/100 of 1 per cent). Such soaps are on the market.

Oliver gives the following as the method of manufacture of an oil soap: One part of caustic soda or caustic potash is mixed with four parts of alcohol. To this mixture there is added oleic acid in the proportion of one and three-fourths parts of the acid to one part of the alcohol-alkali solution. The mixture is heated and to it is added benzin or benzol in the proportion of two and one-half parts of benzin to one part of the mixture. This forms the oil soap which is added to the benzin.

Those who work in an atmosphere of benzin get benzin drunks. They later develop headaches and giddiness, and then they vomit and become stuporous. The measure of prevention is fresh air. Hoods and exhaust fans should be used, and the body of the room must be well ventilated. Separate lunchrooms must be provided.

Benzin affects women more than men. Anemic girls should not be allowed to work at trades in which much benzin is used.

To sober the jag nothing is so good as plenty of cold fresh air. A glass of milk internally helps some.

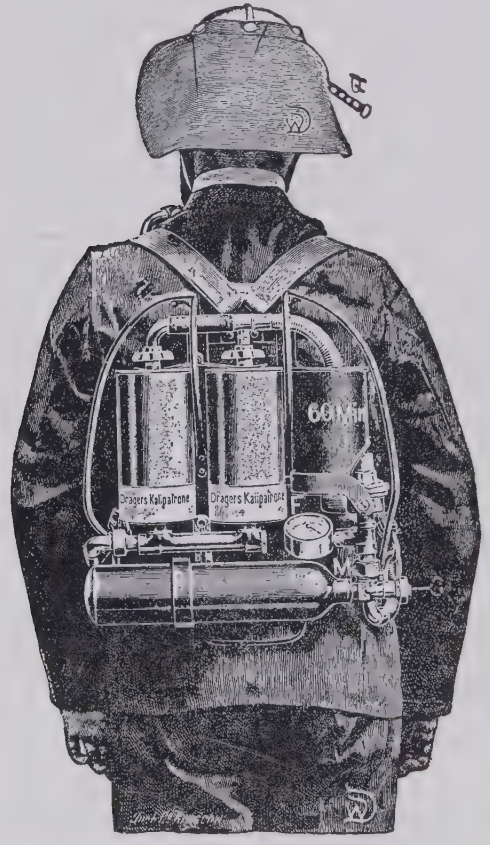


FIG. 371.—DRÄGER OXYGEN APPARATUS FOR USE IN MINES. (Report of Illinois State Commission of Occupational Diseases, Jan., 1916.)

CAISSON DISEASE

In some engineering projects to prevent walls from falling or water from flowing in, the workman must work in air compressed chambers called caissons. This is all right for the work but it is hard on the worker. A man entering a compression chamber has in his blood the amount of gas proper when the atmospheric pressure is normal. Compressed air drives into his blood an excessive amount of gas. This does no harm so long as the pressure is kept up but when the man gets out of the high pressure air the extra gas tries to get out of his blood. It goes out of solution and accumulates in the blood vessels as bubbles of nitrogen gas.

Caissons are usually badly ventilated; they are too hot and too humid,

and for this reason a man in a caisson can only do half a man's work.

But the great harm comes when the man goes from the bad air of the caisson into the good air of the outside. The bad air of the caisson eats into the employer's pocketbook but the attempt of the worker's body to readjust itself rapidly to outside conditions after working in the caisson causes compressed air to eat into his life.

When the Hudson River tunnels were being dug Moir's air locks were put in and thus the death rate from caisson disease was reduced from 25 per cent to 1 per cent. In the New York river tunnels the rate fell to 1/5 of 1 per cent.

Schroetter recommended that where men work under one and one-half atmospheres they should work in eight-hour shifts and after work they should pass through the decompression chamber in less than fifteen minutes. Where they work under three atmospheres they cannot work in shifts of longer than four hours and a longer time must be consumed in decompression.

Haldane has shown that decompression should be accomplished with a rapid drop at the beginning, followed by a slow, gradual fall, and that if during the process bubbles begin to form in his blood and the man gets into trouble the air pressure should be run up again until the bubbles go back into solution, whereupon decompression should again be undertaken with watchfulness and care.

An oxygen tank is kept handy and ready for use. When gas bubbles form in the blood the hemoglobin works at low efficiency. Inhalation of oxygen for a few minutes will keep the patient going until the bubbles are got rid of and the difference between inside and outside pressure is adjusted. Working in a caisson and diving are dangerous occupations but the degree of danger is determined by the degree of obedience to proper rules and regulations. This presupposes an equipment to make life safe.

DUSTY TRADES

Men who are at work need air which is neither too hot nor too cold, too wet nor too dry, and which moves in currents strong enough to be felt.

There is another quality of great importance and that is that it should be fairly free from dust. A good deal depends on the kind of dust. The dust from a country road on a hot, sunshiny July day is much less harmful than street dust in a large city and is almost harmless as compared with the dust of a metal polishing establishment. The most harmful of all dust is that containing large numbers of live disease-producing bacteria.

Next comes inorganic dust such as stone, metal and glass dust. Of less importance is organic dust such as that of starch and flour mills. The report of the Department of Commerce and Labor on the baking industry states that flour dust is more harmful than starch dust because there is more gluten in the former. These are illustrations of gradations of the harm done by different kinds of dust.

It is advisable for the manufacturer to ascertain the quality and the kinds of dust in his factory. Breathing large quantities of dust gradually impairs the efficiency of the workers. Haldane, Martin and Thomas report-

ing to the Secretary of State for the Home Department of the British government in 1904 said:

"So far as the Cornish miners are concerned, it seems evident enough that the stone dust they inhale produces permanent injury of the lungs—gradually in the case of ordinary miners and rapidly in the case of machine drill men—and that this injury, while it is apparently capable of gradually producing by itself great impairment of the respiratory functions, and, indirectly, of the general health, also predisposes enormously to tuberculosis of the lungs."

FIG. 372.—RESPIRATOR. (From *Rauch und Staub, III*, 9, June, 1913.)

The thirty-fifth annual report of the Local Government Board of England says:

"The behavior of consumption toward dust-producing occupations lends support to the theory of predisposition to infection by some induced alteration of the lung substance."

It is the opinion of those investigators that, aside from the disease caused, dust causes inefficiency.

The manufacturer can have a determination made of the character and quantity of dust in his factory. However, he can get a pretty good line on it by a careful study continued sufficiently long of the consumption rate of his men. The study should be careful enough not to mislead. The number of men who have fooled themselves on this point by shallow observation would fill a book.

The above cited report gives figures for consumption among English workers. Using farmers at 100 as the base they report as follows:

FIG. 373.—SHOWING THE CHOKING WITH SOOT OF A BREATHING PORE OF A LEAF OF A SILVER FIR TREE. (Arthur C. Ruston, University of Leeds.)

"Ironstone miners, 133; carpenters, 148; coal miners, 166; corn millers, 166; bakers and confectioners, 177; blacksmiths, 177; locksmiths, 194; wool workers, 202; tin workers, 204; carpetbag makers, 213; bricklayers, 215; ropemakers, 220; coopers, 238; cotton spinners, 244; lead workers, 247; brass workers, 250; stone quarriers, 261; iron workers, 292; copper miners, 307; copper workers, 317; lead miners, 319; glass workers, 335; filemakers, 373; cutlers, 407; earthenware workers, 453."

Miss Brandt's table for the United States places marble and stone cutters, cigar makers, plasterers and printers even higher than cutlers.

The relation between consumption and dust is easily seen. A manufacturer by careful study of the bad air diseases among his men can get a fair idea of the harm his factory is doing.

DUST IN SHOE FACTORIES

Such statistics as we have show that shoemakers have an undue proportion of lung and throat disease. Their consumption rates are high. In part, this is due to contagion, for the chance of catching consumption is high in a trade where the man at the next bench is exceptionally liable to be a consumptive.

Another reason is the dustiness of the air in a shoe shop. Sir Thomas Oliver says dust causes colds and pneumonia as well as consumption. Therefore, we are prepared to believe that shoemakers frequently are laid up with colds or, having a cold and needing the pay, they stay at the bench and get through the day without making much for themselves or their employers.

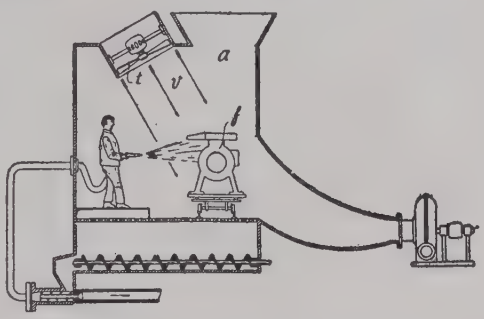


FIG. 374.—CABINET FOR SAND BLASTING. The operation directs the blast against the casting (b), a current of air driven by a fan (t) carries the dust into a duct through which it is sucked by the fan shown at the right. (From *Rauch und Staub, II*, 5, Feb., 1912.)

Drs. Hansen and Wolcott, having studied the boot and shoe industry in Massachusetts, made a report on existing conditions and recommended certain methods in a paper distributed in the exhibit of the Massachusetts health department at Washington.

To estimate the amount of dust, they exposed slips of paper, sometimes dark paper, sometimes light, at the point usually occupied by the workman's head. A piece of heavy gummed paper, 10 by 7, was painted with a mixture of thirty parts glycerin and seventy parts water. This was exposed while moist in the position usually occupied by the workman's head.

The exposure was for a definite time while the machine run by the operator was doing its regular work in the regular way. The cardboard was then covered by a thin rice paper ruled into one-inch squares or else by a gelatin film. The preparations for microscopic examination were made by treating glass in the same way and then exposing it as in the case of the paper.

The amount and the type of dust having been determined the experimenters proceeded to calculate the size of the hood, its location and the size of the ducts leading from it. Next they calculated the amount of negative pressure needed to lift the shoe dust and therefrom the size and speed of the fan required. And finally the results were checked by an examination of the dustiness of the air at the breathing zone.

Shoemaking should not make men inefficient. The factories in Massachusetts were generally well lighted and fairly well ventilated. The advantage of good lighting is so great that most of the factories are surrounded by yards and most of the machines except the stitchers are close to windows. The only poisonous fume is that from naphtha and that is easily controlled. An effective control of dust should make shoemaking in factories a healthy trade and its workers men of high efficiency.

MEN WHO WORK IN WET AIR

There are certain trades where the workers are kept in moist air and are thereby made uncomfortable, inefficient and sometimes ill. Dr. Graham Rogers investigated 215 workrooms in New York State. In 18 per cent the humidity was over 70 per cent saturation. The worst offenders are pearl button factories, bakeries, clothing manufacturers, cigarmakers, printers and laundries. The British parliamentary commission found humidities high among cotton spinners and weavers. Cooks, greenhouse workers, tunnel diggers are among a long list of workers who are subjected to air which is too wet.

Fluegge in Germany and Haldane in England have shown that when the temperature rises to 80° with moderate humidity or much above 70° with high humidity depression, headache and dizziness come on. When the air reaches 78° temperature and 100° humidity Haldane found that men begin to get fever. Those who work in warm, moist air suffer from heat more than any other group. They get headaches and presently fall over from heat stroke. They are subject to rheumatism, asthma, colds and all kinds of infections.

That is to say, if one hundred men as nearly alike as possible were divided into two groups and one was put to work in a warm, damp bakery and the other in a well ventilated room with a temperature of 68° and a humidity of 60°, more of the first group would develop inflammatory rheumatism than of the second. If a group of women were similarly divided and one half put to work in laundries and the other half in places with a proper humidity and temperature the latter group would be freer from colds.

Winslow in his address before the National Educational Association on July 14, 1911, said:

"We have thus the somewhat paradoxical condition that excessive moisture increases the bad effect of either heat or cold."

The man who works in wet air cannot do a full day's work in either winter or summer. This the "traffic must bear." He is sick or otherwise knocked out more than the average. This also the traffic must bear.

SANITATION IN THE CLOAK INDUSTRY

[From the Bulletin of the Joint Board of Sanitary Control in the Cloak, Suit, and Skirt Industry]

Human Engineering for 1911 quotes as follows:

"Workmen in safe and sanitary shops are not only more healthy; they are more efficient. Efficiency is the very soul of industry. Ours is the first attempt in the history of industry in this and other countries of a trade to control its own destiny. This is the first common ground upon which organized labor and organized capital may peacefully meet, and consists in safe and sanitary shops."

Proceeding on these basic principles the Joint Board of Sanitary Control

of the Cloak, Suit, and Skirt Industry conducted "a shop to shop sanitary inspection of the cloak making industry in Greater New York."

The board consisted of two inspectors, one office secretary and one messenger. They made a total of 1,693 inspections, appointed twenty-five shop committees, gave twenty-four noon lectures, and distributed 58,500 bulletins and cards. They circulated this notice:

"To Shop Owners: Our sanitary certificates are ready. All owners of shops which conform to the following standards are entitled to a certificate, which will be granted upon application and inspection. The possession of our sanitary certificate will be a positive indication that your shop is safe and sanitary."

There follow twenty-eight sanitary requirements. Among them are such as:

"No shops to be allowed in a cellar.

"Sufficient window space to be provided so that all parts of the shop will be well lighted from 9 A. M. to 4 P. M.

"At least 400 cubic feet of space, exclusive of bulky furniture and materials, should be provided for every person within the shop.

"The shop should be thoroughly aired before and after working hours, and during lunch hours, by opening windows and doors.

"All seats to have backs."

Some of the remaining twenty-three requirements are quite as important as these which have been cited. Some requirements of great consequence are not found; but the leaven is there and it will continue to work until things become as they should be. When that time comes Ghetto consumption will rapidly diminish and the workers, relieved of this great burden, will be more contented and happier. Inevitably business will be more secure.

The movement is emphatically right. No better business policy could be conceived than for manufacturers engaged in other lines to follow this example. Workingmen have a right to demand safe and sanitary shops. Employers have a right to demand of workingmen personal cleanliness, help in keeping the shop clean and good home hygiene.

WHAT THE WORKINGMAN SHOULD DO

Some of the unions are assuming their duties. The cigarmakers, printers and bakers are doing well; others are taking up their duties in a less satisfactory way. The unskilled laborer is the point where the line of progress lags—the wandering laborer who lives in lodging houses, the newly arrived immigrant, the country boy newly come to town, the average negro.

The first obligation of the employee is to go to work in the morning in the best possible physical condition. This means good food, good air and good sleep at home. His home should be the most sanitary that his means will afford, his foods the most nutritious that his wages will allow. Several things are needed for a sanitary home some of which are expensive while many cost effort only.

If the employee works at a dusty trade he can contribute his part toward keeping the dust down as much as possible. He can keep from infecting the

dust by not spitting on the floor. If he works at a poisonous trade he can wash his hands with frequency. He can wash especially well before eating. He can wear gloves in certain processes. He can be careful of dangerous machinery. He can help in the maintenance of standards by a proper use of the toilet facilities. He can stand with those who insist on fresh, cool air in the working room. He can do his part to prevent the spread of venereal diseases, smallpox, consumption, diphtheria and colds among the workers.

The employee can block the wisest efforts to improve that an employer can make. On the other hand he can lend his support to plans for improvements and thus double their efficiency.

Regarding Matches.—*C. L. S. writes: "Can you advise me whether there is any way by which the consumer can distinguish the poisonous white phosphorus matches from the red phosphorus or the sesquisulphid matches? Do the so-called 'Swedish' or 'safety' matches belong to any one of these processes of manufacture?"*

Reply.—From the standpoint of the consumer white phosphorus matches are about as harmless as those of red phosphorus. The object of the Esch bill was to help the workers in match factories. They were the sufferers from phosphorus poisonings. Consumers were asked to use red phosphorus matches in order to help the workers in the factories. The law has passed and the white phosphorus match industry is at an end in this country. I understand that Swedish matches do not contain white phosphorus—neither do American matches now.

Brass Chills.—*Foundry Worker writes: "I am a brass foundry worker and am often subjected to so-called 'brass chills,' which are due to the inhaling of zinc fumes when smelting yellow brass. Is there any way to prevent it?"*

Reply.—Brass chills result from inhaling the fumes from the pots. The poison, probably zinc, causes the red blood cells to become stippled. Under the microscope the blood cells look as they do in malaria and the symptoms are a little like those of malaria. Of course there is no relation between the two diseases. Dr. Hayhurst of the Illinois Commission on Occupational Diseases advises (a) isolated furnace rooms, (b) hoods over furnaces and pouring places, (c) ceiling ventilators with suction fans, (d) ample space, adequate light, wet cleansing, frequent whitewashing, (e) eliminating boys, women, anemic and tubercular men and alcoholics. As to what you should do, by all means ask the state factory inspector to see to it that your working place is made safe for you.

Danger from Dust.—*H. K. writes that he works in a grain elevator and has a racking cough. The room is dusty and smoky. He breathes a great deal of dust and smoke. He has had this cough for six months and wants to know if the breathing of dust and dirt can turn into consumption.*

Reply.—Nothing more frequently turns into consumption than breathing dust and smoke from working in a dusty place. By all means be carefully examined and without delay.

Writer's Cramp.—*W. E. E. writes: "I am a commercial artist and have been considerably worried on different occasions by a dull, throbbing ache*

in my working hand. This ache extends as far as the elbow. I would like to know what the symptoms are, and what precautions, if any, may be taken to avoid writer's cramp."

REPLY.—Writer's cramp is a paralysis from overuse. It means that the pitcher has been to the well too often. There is no cure except to "let up" before it is too late. Sometimes methods of using the hands so as to spare the overused muscles and nerves can be devised. You should see a nerve specialist.

Protecting Workers from Heat.—*E. D. D. writes that he has a factory with an occupied basement. In one corner the boilers are located. The remainder of the basement and the floors above are occupied as workrooms. The men complain that the rooms are too hot; that they get heated and the cold air rushing in chills them. In the summer they are much too warm. Can anything be done about it?*

REPLY.—In the dairy husbandry building of Cornell University they have a large workroom in the middle of which is a sterilizing room. The milk cans are run into the sterilizing room, the doors shut tight, and the steam is turned on. The temperature of the sterilizing room gets to 200°. The large workroom is not heated by it. How is it done?

The walls of the sterilizing room are made of hollow tile. The doors are heavy and double walled, with insulation between. Try it. You will get more work from your men. They will have less pneumonia and be generally healthier.

Telegrapher's Palsy.—*S. writes: "I am now middle aged. During all my working life my occupation has been office work, telegraph operator, bookkeeper, clerk, etc. I am right-handed. For several years my right arm has been losing its activity and willingness to do its work. It is only with great effort that I am able to use it. The effort to make it work causes me mental pain and distress. It wants to cling to my side; when idle it squirms and twists around towards my body; when I attempt to write I cannot hold it down to the desk; it wants to fly up or drop down and hug my side. I cannot write in a straight line—the finish of a line will be considerably higher than the commencement; there is a dull pain in the upper arm and shoulder, also in my right side directly under and in front of the arm; there is no swelling. Is there any way I can restore my arm to its activity and usefulness?"*

REPLY.—The dull ache and the pain described by you suggest that you have telegraphers' palsy. The tendency "to cling to your side, squirm and twist toward your body, to fly up or drop down and hug your side" suggests a mind cause. Perhaps it is partly due to each. If you have telegraphers' palsy get into the best hands possible and follow directions. If you are going to tinker with yourself you had better quit telegraphy and take up something where your telegrapher's hand is not important. As it is, your hand is your tool. Give it the best attention possible.

Case of a Painter.—*C. W. H. writes: "Early in the spring in part of my right hand would come and go a peculiar sensation as if it were asleep and partly numbed. It gradually got worse and reached to the elbow. Sometimes during an attack I could not use the hand. Two months ago I placed myself under treatment by a doctor who says it is a touch of paralysis brought on by lead poisoning. I am a painter. The treatment seemed to*

benefit me at first, but later the attacks were more severe and more frequent. My general health is good. Will massaging and electricity help me?"

REPLY.—Lead poisoning is much more frequent than generally supposed. As your disease is not of long standing or far advanced you should get well. Massage and electricity will help you after your disease has ceased to progress. In other words, when the disease has subsided they help you to regain the use of the muscles and nerves. Keep in the open air and keep your bowels open. Lead poisoning brings on premature old age and heart and kidney disease. After you get well change your trade or else be much more careful about keeping your hands clean than you have been.

Cause of Lead Poisoning.—*O. L. writes: "When you speak of a disease as 'lead poisoning' what do you mean ? What causes it?"*

REPLY.—A disease affecting the nerves and blood, and, in some measure, all of the tissues. It results from prolonged drinking or swallowing of lead. It is found most frequently in painters and is then known as "painter's colic" or "lead colic." With them it results from white lead, which gets into their food from their hands, though some absorbs through the skin. It sometimes results from the use of bottled or charged waters which have been allowed to become contaminated with lead. An ultimate effect is premature senility. This results from thickening of the arteries.

Too Long a Workday.—*N. L. writes: "I am a man about 20 years of age. I have been working in an office for six years. Since the first of this year I have been given a position which keeps me sitting most of the day. I naturally have to bend over the desk somewhat, as I have to write a good deal. I have been troubled with backache almost every afternoon for the last few weeks. Otherwise I am feeling pretty well, considering that I am working almost twelve hours daily. I have tried exercising, but it does not seem to help me any."*

REPLY.—You are bending over too long, working too many hours. Backache means nerve tire with you as with nearly everybody else whenever the work is too hard. There is a backache work line. Neurasthenics get to it quickly. The well balanced get to it more slowly. But twelve hours at a desk would give it to a truck horse. The cure is shorter hours, fresher, cooler air in the office, and exercise, preferably play, after work.

Quit Working There.—*Reader writes: "I have been working in a dark basement for one year and five months where I consider the conditions insanitary. Could I continue to work there without harm? The place, being a corner, has three wet walls covered with slime, which smells like mushrooms. Water comes in constantly, decays, and smells bad. Mold forms on everything. It is poorly ventilated."*

REPLY.—You cannot continue to work there without harm. A dark basement is bad enough but one with damp walls covered with slime and where mold forms on everything is intolerable. If you stay there long you will get rheumatism, consumption, blastomycosis, or some other sort of bacterial disease.

CHAPTER XLVIII

Hot Weather Advice

Coming north on an Illinois Central train I read a booklet got out by the immigration department of that road. The write-ups of Mississippi towns invariably stated, "We have no sunstroke." These statements I know to be substantially correct. What is the solution?

First, the place of atmospheric heat in causing death is subject to a good deal of interpretation. Cities anxious to refute the charge that heat causes deaths amongst its people are careful to see that old age, heart disease, Bright's disease and baby complaint get their deserts. Towns that do not care call every death in hot weather where heat can be dragged in a death from heat.

After proper allowance has been made for these considerations there still remains the fact that summer resort Chicago has more heatstroke than Mississippi. Why?

There is an art in bearing heat and many people in Chicago have not learned it. The suffering is greater in the beginning of the season than later on, because experience teaches the art to some.

1. The first item of the art to master is in dressing. The clothes should be as few as the law allows and as light and porous as possible. Coming in today I met some boys wearing two garments. If they were suffering they did not show it. Our intermittent warm and cool weather makes us more susceptible to heat than others and it is one of the reasons which makes us wear hot clothes in hot weather.

2. The second is eating. Fruits, salads, vegetables, buttermilk, cereals, bread and lean meat (and not over much of the last two) are proper. The most important item to control is quantity. Next are fats and greases—cream, butter, gravy, salad dressings, olive oil, fat meat and nuts—a tropical diet for tropical weather. One-half of the usual diet will suffice when the temperature goes over 90°. A part of every man's boiler capacity is used to make work-steam, the remainder is a heating plant. For comfort's sake shut down the heating plant when the air sizzles.

3. Drinking. Avoid beer and every sort of cooling drink containing wine. Alcohol burns with a quick, hot flame that blisters the boilers and then dies down. Heatstroke is a blistered boiler.

4. Bathing. Promote sweating by baths, internally and externally. By baths internally is meant drinking plenty of water.

5. Elimination. Keep the excretory organs working.

6. Crowding. Keep out of the crowds. Why burden yourself with the other man's heat?

7. Drafts. Keep away from still air. Keep close to a draft.

8. Sleeping. Sleep cool. Rooms were invented for winter necessities. Some can sleep under the trees, some on porches, some on roofs. Three hours after sundown the roof is cooler than the room and the pavement is cooler than the porch.

9. Worry. Never mind the weather. To think hot is to feel hot. Deserve to be cool and then forget what you can't help.

WORK IN HOT WEATHER

The human stove has two major and several minor fires going. The fires go all the time, night and day, sleeping and waking, still and moving, so long as life lasts and for a short time after. But the more the fires are fed the more heat the stove makes. It is not within our power, compatible with life, to end the fires, but it rests with us to make more or less heat.

The most important fire, and one that can be turned up or down, is that fed by food. The next most important contributor to the sum total of heat is muscular movement.

Every act of the body is attended by the production of heat. The digestion of food is a pretty good heat producer. The liver cells, albeit well oiled, work so as to produce considerable heat. The flow of blood in the vessels, the coursing of air in respiration and the oxidation of blood in the lungs—each of these is a heat producer.

The great heat making organs are the muscles; and the amount of heat produced by them is under considerable control. Thompson in his "Dietetics" computes the number of calories required when a man is working hard as 4,150, with 2,700 for a man at rest.

By calory is meant the amount of heat forming substance in a given amount of food. When fifteen grams of fuel burned give off enough heat to raise the temperature of 2.2 pounds of water 1.8 degrees we say it gives one calory. A man at hard work, then, needs about one and a half times as much food measured in heat units as when at rest.

Scientists have had a way of checking such conclusions as these. By using an instrument called a calorimeter they are able to measure the amount of heat made by a man at work as compared with the same man at rest.

The human stove has an engine attached. These scientists have found the engine a most efficient machine. They find that a man at work makes more heat than a man at rest and the difference almost exactly equals the added number of calories required as food.

The practical application is that all unnecessary muscular labor be cut out during hot weather, at least during the torrid part of the day.

The people in Rome shut up their stores and rest from twelve to two. The people of the southern states do a good deal of their work during July, August, and September at night when the moon is shining, and in the early morning and late afternoon at other seasons.

During the long days of summer an eight-hour day can easily be managed without making use of the heat of the day.

DISEASE IN HOT WEATHER

When hot weather comes on some of our disease enemies get less active and some more so. The ordinary contagious diseases become much less harmful. Smallpox almost disappears. Whenever a community carries a smallpox epidemic over into hot weather it is certain there is something wrong. Either the government is weak and ineffective or else the cranks are unusually numerous and active.

A large city in this part of the United States is certain to have some smallpox poured into it in the winter and spring. It cannot be blamed for that. It may spread a little in the spring months—it cannot be blamed for that. But when the smallpox cases continue to bob up during sizzling weather somebody should be punished.

Diphtheria, scarlet fever and measles can also be expected to let up. Pneumonia runs to less than a half of the February rate. In the parts of the country where pneumonia, contagion and colds are the principal diseases the physicians take their vacations in summer. On the other hand certain diseases are more abundant and some of them more hazardous in summer.

First on the list is summer complaint in babies and next in importance comes malaria. Typhoid is of more importance in summer than in winter, though autumn is the typhoid season. During the hot months typhoid seems to be laying the foundation for its fall work. The people who are having typhoid are infecting wells and milk supplies. The flies that are to carry it later are multiplying. The amount of pellagra increases, and so do the less important intestinal disorders.

The heat of the sun's rays is too great for bacterial prosperity. Certain parts of a ray of sunlight are actively bactericidal. Then why is it that in the season when the sun's rays are hottest some bacterial diseases are at their worst?

There are two reasons. Enough of certain germs escape the great heat and the bright light to effect their part of the harm; in the second place, the effects of spoiling are greatest in hot weather.

In summer complaint in babies a very important factor is spoiled milk—not badly spoiled milk, not milk that is offensive to the smell or is even off in taste but which is spoiled so far as baby feeding is concerned. There are those who claim that pellagra is due to spoiled meal. The minor digestive disorders are also due to spoiled food.

To prevent these disorders ice is required. The heat of summer is bad enough on the baby but it is worse on his food. It is not feasible to keep the baby on ice. It is feasible to keep the baby's milk on ice and, though not so important, the food of the grown up should also be kept on ice—and some very great authorities think this injunction should apply also to meal in summer.

THE LIVER IN HOT WEATHER

Ordinarily the liver comes down as low as the edge of the ribs, about three inches to the right of the median line. Therefore whenever it swells it must push downwardly for it cannot bulge upward.

The volume of the liver changes constantly. It is a great blood reservoir and its volume is changed by change in the amount of blood within it. Its own cells increase and decrease in size according to the work they do and this changes the size of the liver.

The liver is a favorite place for the storage of surplus food. Man is a provident animal. Socially he hoards his treasure in savings banks, warehouse bins and cold storage houses. But what he learned in a social way as he emerged from savagery his body cells had always practiced. This statement is true of almost every principle of community life. For example: When a man eats more than he needs the surplus is converted into easily burned fat and stored in the liver tissues toward the possibility of a "rainy day." The liver is one of the most elastic and most serviceable of these great warehouses.

As the liver enlarges trained fingers can easily feel it pushing downward below the ribs and under the softer muscles. Amongst people in hot climates the liver nearly always swells in August and September. It comes a half inch farther below the ribs than in cold weather. This condition of hot weather liver enlargement is almost the rule in the people of the Gulf states and is frequent even as far north as Chicago.

The question comes up, Is this the result of the heat? If not, to what is it due? *The answer is, It is not due to the atmospheric temperature but is due to eating too much.*

The engineer of an office building runs his fires so as to make steam for the elevators and heat for the radiators. In summer time he uses less coal and carries less steam because the radiators are not in use. When the thermometer is over 85° a man needs little steam in his radiators. If he continues to eat cold weather rations the surplus piles up somewhere. The favorite somewhere is the liver.

When, in August and September, a man finds his liver swollen—or his physician finds it for him—he commonly takes a course of calomel "to touch his liver." A wiser course would be to stop eating until he has burned up his surplus, in the meantime taking milder laxatives. Of course, the really wise plan is to cut down his food beginning June 1 and thus prevent his liver from swelling in August.

Now, everybody knows that the desire for food lessens in hot weather. People who eat ravenously are willing to nibble in hot weather. Many people know that heavy eating makes the heat worse—increases the discomfort from the heat.

But the habit of eating is so strong that many people eat too much in spite of these two considerations. It may help some of these to control themselves to know that the swollen livers of hot weather are due to overeating and that a large liver persisted in means eventual organic or functional disease.

CROWDS IN HOT PLACES

A Chicago theater carries this advertisement:

Temperature in this theater, 70°.
Temperature in the street, 90°.

I do not vouch for the accuracy of this advertisement. I do not know anything about it one way or the other but the advertisement of itself stimulates a demand for a cool theater and it is certain that that demand will bring about cool theaters.

We have faith enough in the good of it to advertise the advertisement. I do not know but I presume the theater chills the air with which it ventilates. This method is used in restaurants in the basements of two Chicago hotels. It may be true of others. If it is not it should be.

When a thousand people are together you are dealing with a thousand stoves. In the winter such a crowd would make heat enough to heat themselves and the walls of the room but not enough to heat the needed fresh air. In the summer they make enough heat to make life a burden wherever there is no proper effort to control it.

The excess heat can be removed if air enough is used, but it is easier done (and in some places it can only be done) by chilled air. Cooling a room with air at 90° does not get very far. Great crowds and very artificial conditions demand very artificial remedies.

When a man says our grandfathers never had chilled air and therefore why should we, the answer is—15,000 of our grandfathers never crowded into one room located on ground worth a million and a half an acre. We can quit crowding at one end of the line when they quit crowding at the other.

Whenever we have congestion of occupation we get congestion of heat making. Now, when a man makes heat he must pass it on or he gets a self-made heatstroke, sometimes called sunstroke. If the air around him is cool or moving fast he can dump his load of heat with ease. If the air is warm, or stagnant, or wet, or all combined, he becomes uncomfortable and is soon overcome. Whether it be summer or winter the man is the hottest thing in the room. The next hottest is the air which is next him.

It is all right for the restaurant keeper to tell the man to wear loose open clothes, dark underwear and white top wear and to keep his own fan going. But has not the man a right to demand that the room temperature be kept as low as 70° and the humidity as low as 50—the first that he may radiate heat directly; the second that he may lose it by evaporating sweat?

How many places in town could advertise a cool dining room and make good?

How many could advertise a cool kitchen and make good? Food prepared by hot cooks in hot kitchens is liable to have something in it which is not nice to think about.

How many men refuse to patronize a hot theater or restaurant? Heat kills many people; cold but few.

SLEEPING IN HOT WEATHER

Sleeping in the hot weather is a difficult proposition for some people. The night hours are short; the streets are noisier; Morpheus, the god of sleep, has difficulty in getting his orders obeyed.

In summer time, when the rising sun is about to catch up with the setting sun, when the birds are singing, the sparrows chattering, the rooster crowing, the milk cans rattling, and the neighbors gossiping—all in the open air and in the heart of the sleeptime of the early morning; and when the thermometer keeps above 85° all night long Morpheus' job is liable to give the old man nervous prostration. We can do a good deal to help him out.

We can scarcely claim much flexibility in our sleeping customs. The house is no place in which to sleep in hot weather. More than half the living places will permit of sleeping on a porch. In case there is no porch in some instances a fire escape may be made use of. In other cases the roof is available.

Many have the idea that a roof is always hot because they know that rooms just underneath the roof are generally so.

The contrary is true. *On the roof it is always cooler than on the pavement and once the sun has gone down on the roof it shortly becomes a comfortable spot. The moving air can reach it far better than it can reach the pavement.*

This factor, the ability of moving air to reach the sleeper, is the determining factor in an under-the-roof room. If such a room is so arranged that the side walls can be dropped or lifted and the air allowed to blow through it will not be a hot sleeping place.

For some of those not able to sleep on roof or porch yard space may be available. Where none of these is to be had, why not sleep in the parks and squares? Many men of small earning capacity have to choose between sleeping in the park and sleeping in a room the walls of which feed heat to the room all night long as well as keep out the air.

Would it not be advisable for park boards to take note of this and then extend invitations to the people to sleep in the parks?

The added expense for policing would not be great but the gain in working capacity as well as in health would be enormous.

CHAPTER XLIX

Insects

PARASITICAL PESTS

RED BUGS

As a rule red bugs do not bore into the skin. They remain on the surface and suck through the skin. They sometimes get into the ducts of sweat glands and occasionally get well into the skin. Herrick describes one case in a chicken in which there was a berrylike cluster of them below the surface of the skin.

Both Herrick and Riley advise that to keep them off the body the stockings and underwear be dusted with flower of sulphur. Chittenden advises that the underwear be dusted with powdered naphthalene. Sulphur ointment, carbolized vaselin or salted butter will kill the parasites on the skin. To allay the irritation bathe the itching patches with a saturated solution of soda in water.

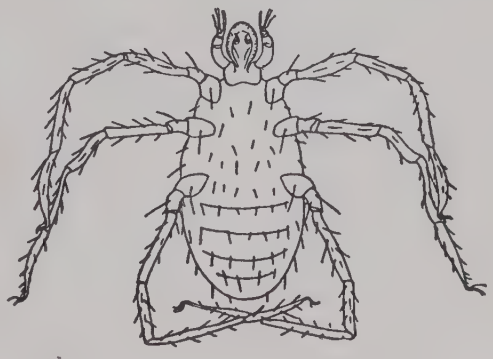


FIG. 375.—A HARVEST MITE. (Ealand.)

STRAW ITCH

Men who work around straw or who sleep on fresh straw are liable to develop an acute eruption as the result of bites by a straw parasite. The name of this disease is dermatitis Shamberge. The name is worse than the disease.

There are no parasites in old straw. The man who must work in fresh straw can protect himself by the use of powdered sulphur or naphthalene. Goldberger recommends greasing the body with lard. The best wash is soda water. Salt water and dilute ammonia water are good. The best local application is sulphur ointment.

ITCH PARASITES

Fifty years ago the skin disease now known as itch went by the name of the seven-year itch. Now we know that the cause is a mite which burrows in the deeper layers of the skin, and acting on this knowledge, we know how to cure it in a week. Seven-day itch is a better name than seven-year itch.

Stiles' method of cure is as follows:

1. Rub the entire body except the face with green soap and water for twenty minutes.

2. Stay in a warm bath for thirty minutes. Rub with green soap while in the bath.

3. Rub sulphur ointment into the skin for twenty minutes. Leave the ointments on for five hours.

4. Wash off the ointment with soap and water.

5. Sterilize the clothing, especially the underclothing, with heat. As this does not kill the eggs, five days later repeat in order to kill the parasites which have hatched meanwhile. Thin-skinned persons should modify the above plan.

LICE

There are three varieties of lice which regularly live as human parasites—the head louse, the body louse and the crab louse. It has been proved that lice transmit typhus fever. Furthermore, it has been proved that a mild form of typhus fever known as Brill's disease is present in many portions of the United States.

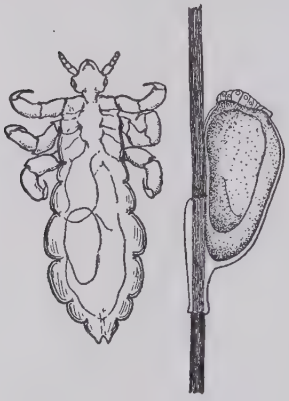


Fig. 376.—Louse and Nit.

We learn that the European soldiers in the trenches pull off their clothes and leave them on ant heaps as a means of ridding themselves of lice. This may work with body lice. It will not work with the other two varieties.

For the body lice the clothes must be baked, steamed, or washed in gasoline. Two treatments at intervals of a week are required.

For head lice several washes are effective. Kerosene, 2 per cent carbolic acid and a tincture of cocculus indicus are good. The treatment must be repeated as nits are not easily killed. Mercurial ointment applied will kill crab lice.

BEDBUGS

From the standpoint of disease, bedbugs are not important. They have been known to spread plague, *kala-azar, trypanosoma,* relapsing fever, Aleppo boil, typhoid fever, tuberculosis, and syphilis. All but the last three of these diseases are of little importance in this portion of the world. It is not thought that bedbugs are important factors in the spread of any of them.

Bedbug eggs hatch in six to ten days. If the bug gets plenty of food it reaches the adult size in thirty-five days. If poorly fed, one hundred and fifty days may be required. A bedbug can live without food for more than a year.

While they prefer to bite human beings they do not hesitate to feed on cats, dogs, rats, mice, swallows, canaries, sparrows or any other accessible warm-blooded animals.

Much the most efficient method of destroying bedbugs is by the use of hydrocyanic gas. This method is too dangerous to be used except by persons who have had experience with it.

The burning of sulphur is not satisfactory. Herrick thinks probably this has been because not enough was burned and the exposure was not for long enough. He suggests that the cracks be thoroughly stripped; that two pounds of sulphur for each 1,000 cubic feet of air be burned; that everything be dry; and that the gas be allowed to act for eight hours.

As local applications kerosene, gasoline, boiling water, and a mixture of alcohol one pint, spirits of turpentine one-fourth of a pint, and corrosive sublimate one ounce are all effective. Whichever of these is used to get results treatment must be thorough and it must be repeated at least four times at intervals of four days.

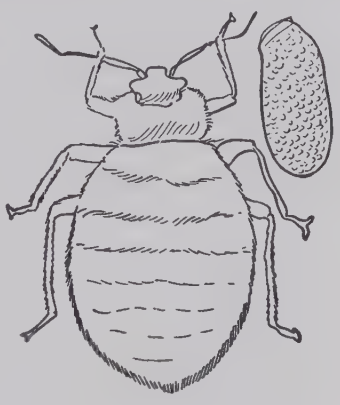


FIG. 377.—BEDBUG.

FLEAS

Fleas certainly spread plague. Possibly they also spread leprosy at times. They may spread one form of tapeworm. They may spread trypanosoma.

Riley recommends lotions of carbolic acid, 3 per cent, or camphor and carbolated vaselin to relieve the irritation of a flea bite.

The best fumigation against fleas is that by hydrocyanic gas. The best single measure against fleas is to get rid of the nits, especially in the cats and dogs. Riley tells of a woman who held a half-grown kitten in her lap for a short while and then gathered up a teaspoonful of flea eggs which had fallen from the kitten to her dress.

Perhaps the second best single procedure is to get rid of the rugs and carpets and to keep the bare floors clean. Dr. Skinner scatters five pounds of flaked naphthalene on the floor of a room, closes the doors and windows and leaves things for twenty-four hours. He then sweeps up the powder and sprinkles it on the next room. Riley quotes him as saying, "The flea question is solved."

TICKS

In the Rocky Mountains a form of spotted fever is spread to human beings by ticks. The Public Health Service rids an infected mountain side of ticks by grazing it with sheep. Grazing is begun in the valley and the sheep are slowly worked up the mountain side.

STINGING PESTS

Spiders do not deserve their bad reputation. None of them will bite if escape without biting is possible. Most of them are harmless when they do bite. Only two varieties are dangerous to life—the tarantulas and the hour-glass spiders—and these are only dangerous under most exceptional circumstances. On the other hand they are efficient insect destroyers.

Spider webs do not soil a wall. They show up a dirty wall as such—that is all.

A solution of cooking soda in water should be applied to the bite. If there is need of it thirty drops of aromatic spirits of ammonia in a wineglass of water may be given.

SCORPIONS

The bite of a scorpion less than two inches in length is no more irritating than a bee sting. Large scorpions may carry a dose of poison capable of producing a good deal of local irritation and causing some disturbance of the system. Strong soda water should be applied locally. Aromatic spirits of ammonia may be given internally if the face is pale.

CENTIPEDES

The centipedes of the United States do not carry enough poison to endanger human beings. The treatment of centipede bites is the same as that of tarantulas.

BEES, HORNETS, WASPS AND YELLOW JACKETS

The stinging apparatus of these insects is a tube barbed at the farther end. This stinger is a part of the apparatus for depositing eggs. Therefore only the female can sting.

As the barbs hold the stinger in the wounds the insect stings but once in a lifetime. At the base of the egg depositor are two glands. The secretion of one of these is acid; of the other, alkaline. The poison does not become poisonous until the secretions mix.

For a sting there is no better application than wet soda or strong soda solution.

Hornets, wasps and yellow jackets do not make bad neighbors. Herrick quotes an English entomologist, Westwood, who visited us in 1840, as having written the folks back home: "The Americans, aware of the service of hornets in destroying flies, sometimes suspend a hornet's nest in their parlors."

To destroy a yellow jacket's nest pour carbon bisulphid into the opening. If you are prudent you will do this at night. To destroy a hornet's nest plug the opening and pour kerosene on the nest.

BLACK FLIES

Probably the most annoying and most dangerous of all American biting insects *per se* is the black fly. The studies of Dr. Stokes suggest that the best applications to make to black fly bites is a solution of muriatic acid in water (1 to 200). Perhaps a solution of pancreatin and baking soda in water would answer the purpose.

To destroy the larvae in the breeding places Conradi recommends phinotas oil. He used half a gallon on a body of water five feet wide by twenty feet long, as a repellant. Forbes recommends a mixture of oil and tar. Riley recommends that equal parts of kerosene and oil of pennyroyal be applied to the face and hands.

PANTRY PESTS

From the standpoint of public health the insects which infest meal, flour, and other foods are of no importance. Nobody wants to eat food infested with bugs or worms, and that is objection enough; but the question is one of taste rather than of health.

INSECTS INJURIOUS TO CEREALS

The darker mealworm and the yellow mealworm eat meal, flour, bread, cakes, and cereals. The confused flour beetle and the rust red flour beetle, infest meal, flour, and cereals. The chief source of annoyance is from the presence of the larvae of worms in the cereal.

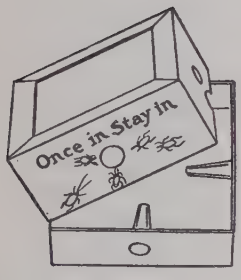


FIG. 378. — TRAP FOR COCKROACHES.

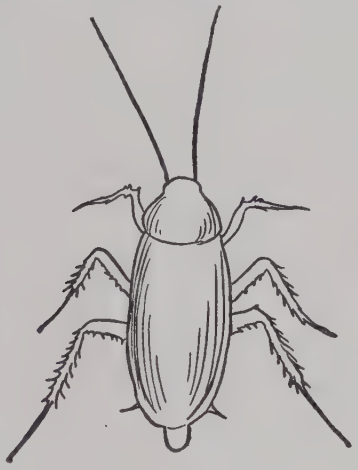


FIG. 379.—COCKROACH.

FIG. 380.—LARDER BEETLE. (Herrick Sanitary Science Series No. 3, Cornell Reading Course, Oct. 1, 1913.)

The Mediterranean flour moth, the Indian meal moth, and the meal snout moth also eat meal, flour, bread, cakes, and cereals. The chief source of objection to the members of this group is that they web up in the cereal.

The insects which show a liking for grain rather than the products of grain are the cadelle, the saw toothed grain beetle, the angoumois grain moth, the granary weevil, and the rice weevil.

The body of the granary weevil contains an irritating poison somewhat similar to cantharidin obtained from Spanish fly. It was used as a substitute for Spanish flies in the southern states during the war. Herrick suggests that if granary beetles are ground up in flour the mixture might prove seriously injurious to persons eating it.

Other pests capable of infesting pantries are the pea weevil, the bean weevil, the broadhorned flour beetle, the coffee bean weevil and a fruit fly which attacks dried, canned, and pickled fruits.

The insects injurious to meats, cheese, and condiments are several. Among them are the larder beetle, the red legged ham beetle, the cheese and ham mites, the cheese and meat skipper, and the drug store beetle.

METHODS OF CONTROL

The most efficient method of killing insects is with hydrocyanic gas. This gas is produced by mixing pure cyanid of potassium, commercial sulphuric acid and water. A portable apparatus for fumigating with this gas is now available. Its use is safe enough for those accustomed to it, but others dare not risk it. Perhaps before long men making a vocation of fumigating with cyanid will be accessible.

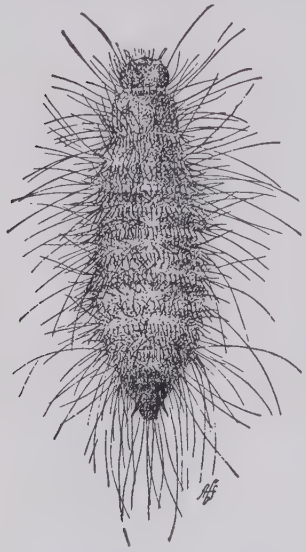


FIG. 381.—LARVA OF LARDER BEETLE. (Herrick Sanitary Science Series No. 3, Cornell Reading Course, Oct. 1, 1913.)

The second best fumigating agent is carbon bisulphid. The chief objection to carbon bisulphid is that it is highly inflammable. Another objection is its odor, but this is not lasting. Flour exposed to carbon bisulphid does not bake quite so well as flour not exposed.

To fumigate with it stop all cracks, vaporize three pounds for each 1,000 cubic feet of air and leave the fumigated space closed for twenty-four hours. This gas kills grown parasites satisfactorily. It is not very efficient against larvae and eggs. Therefore it is usually necessary to repeat the fumigation one or more times.

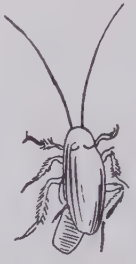


FIG. 382.—CROTON BUG CARRYING EGG CAPSULE. NATURAL SIZE.

Thorough cleansing of all flour bins and meal and cereal boxes is necessary. These should be emptied, brushed out with a stiff brush, and in proper cases washed. The infected food might as well be fed to poultry and hogs.

BROWN-TAILED MOTH

BROWN TAIL RASH

Children are instinctively afraid of caterpillars. Mothers try to convince them that these loathsome worms are harmless. In the main the mothers are right. The great horned tomato worm and others of his species are harmless. In fact, not one of the butterfly moths can poison by its bite or sting with its tail or with its horns.

Herrick tells us that of the six thousand species of caterpillar in the United States only twenty are poisonous. These twenty poison not by biting but through the hairs.

Very much the worst offender is the brown-tailed moth. In the Middle West but little is known of this form of caterpillar but Riley tells us that, introduced into this country from Europe twenty years ago, it has spread over New England and New York and "there is every prospect that the pest

will continue to spread throughout the eastern United States and Canada, and wherever it goes it will prove a direct pest to man, and to his plants."

The poisoning effect from the brown-tailed moth results from chemical substances contained in the shaft of the long barbed hairs carried on the abdomen and back. These hairs can be carried by the wind and can produce the rash in people who have not been in contact with the caterpillar.

FIG. 383.—CASE-MAKING CLOTHES MOTH (enlarged) (Herrick Sanitary Science Series No. 3, Cornell Reading Course, Oct. 1, 1913.)

The ordinary effect is rash similar to hives, the brown tail rash. The usual site is the skin of exposed portions of the body—the neck, face, and hands.

The rash may be similar in appearance to hives; or it may be like eczema; or there may be oozing bumps; or there may be small boils or pustules.

The hairs may get into the nose and bronchial tubes causing colds and coughs that may be mistaken for consumption. They may get into the eyes causing small lumps like proud flesh. Sometimes these lumps have been diagnosed as granular lids and sometimes as tuberculosis.

FIG. 385. — BLACK CARPET BEETLE. (Herrick Sanitary Science Series No. 3, Cornell Reading Course, Oct. 1, 1913.)

FIG. 384.—WEBBING CLOTHES MOTH (enlarged). (Herrick Sanitary Science Series No. 3, Cornell Reading Course, Oct. 1, 1913.)

Riley studied some small eye granulations under the microscope. In the center he found a caterpillar hair. Around the center the tissue had an arrangement very like that of tuberculosis. Of course none of the lesions was tubercular. None was caused by tubercle bacillus.

Tyzzer found that the poison from the brown-tailed caterpillar hair caused great changes in the red blood corpuscles. Herrick recommends that the ordinary hives eruption be washed with a solution of baking soda in water. For brown tail rash he uses menthol, ten grains; zinc oxid, two drams; lime water, eight ounces, and carbolic acid, fifteen drops.

Riley says that the patches must not be scratched. Sometimes soda water is the only wash required. In other cases he advises washing with soda water and then applying a 10 per cent ichthyol ointment. A weak solution of creolin, one teaspoonful to a quart of water, is also recommended.

FLIES

FLIES AND TYPHOID FEVER

In 1898 our army preparing for Cuba was disabled by typhoid fever and diarrhea, and the commission appointed to investigate (Drs. Vaughan, Reed, and Shakespeare) reported that flies were responsible.

Evidently as recently as the beginning of this century our antagonism to flies had no great grip on public opinion. Perhaps those of us who are now the Pauls in this crusade are the more Pauls because so recently we were Sauls.

In a study of typhoid fever in Jacksonville, Florida, Terry proves that flies are largely responsible. Surface closets, 8,500 *in number, were used by* 25,000 (41 *per cent*) *of the population. As the closets are widely scattered throughout the city* 75 *per cent of the population live within three blocks of dry closets. Sixty per cent of Jacksonville's typhoid was amongst the* 41 *per cent of the people using dry closets.*

FIG. 386.—LARVA OF THE BLACK CARPET BEETLE.

The 95 per cent enforcement of an ordinance requiring that closets be properly fly screened was attended by a drop of 56 per cent in the typhoid rate, the drop being especially marked amongst the people who used dry closets.

Terry also investigated the possibility of keeping down the flies on a garbage dump by covering the waste with eight inches of sand. He inoculated bread with germs, allowed flies to blow it, and then buried it in the ground. The flies were crawling out of the ground in a week. Along in November, when the ground in Florida was getting cold, it took sixteen days for the eggs to hatch and the flies to get to the top. Four feet of ground was not enough to stop them. Stiles had previously found that six feet would not suffice. When the eggs hatched the young ate the germs on the bread. Bacteria were grown from the fly specks.

A German who tried inoculating bread with typhoid bacilli found them in the fly specks after the flies had been out of the ground twenty-three days.

Terry's conclusion was that dumps would breed flies however much dirt

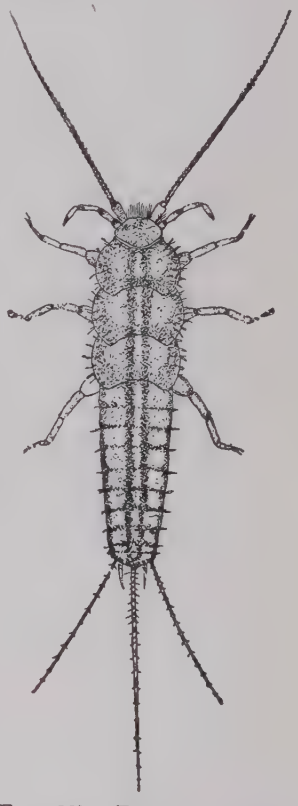


FIG. 387.—FISH MOTH (enlarged). (Herrick Sanitary Science Series No. 3, Cornell Reading Course, Oct. 1, 1913.)

WHERE DO YOU EAT?
Where you eat often determines what you eat
A DIRTY KITCHEN CANNOT TURN OUT CLEAN FOOD
KATHERINE FIELD WHITE.—1913
DELIVER SUPPLIES HERE
SEWER
An underground Kitchen undermines health of the workers
A CLEAN KITCHEN IS AN APPETIZING ASSET
TAKE ALL SUPPLIES TO STORE ROOM
ALLEY
KATHERINE FIELD WHITE.—1913
A Kitchen above ground is more likely to be above suspicion
A PUBLIC KITCHEN SHOULD BE OPEN TO PUBLIC VIEW

Chicago Health Department, Educational Poster No 168

FIG. 388.

was used to cover them. The policy of covering a dump with some clean waste or even clean sand does not keep down flies.

FOOD AND FLIES

Flies are of no consequence except as they affect the food. They do not start any diseases. They serve to carry them from one place to another. Water flows from place to place, therefore typhoid germs that get in at Quincy may sicken the people of St. Louis. One farmer may get typhoid in his milk and then spread typhoid to a hundred farmers' milk by emptying it into a common vat. From this common vat five hundred consumers may obtain their milk. Thus typhoid may be spread all over a town. But about the only chance for solid food like bread, meat, and sugar to spread typhoid is through the help of flies.

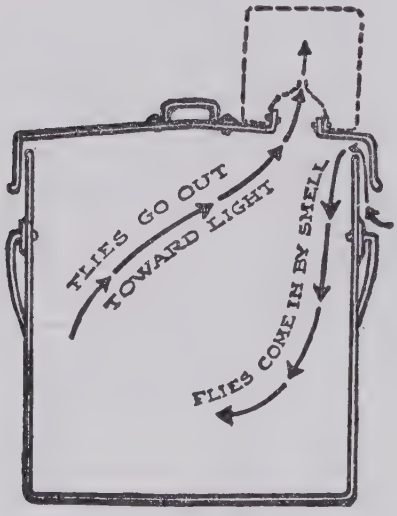


FIG. 389.—THE HODGE FLY TRAP ON A GARBAGE CAN.

A man's water faucet taps the same pipe as that of another man, a man's milk bottle is filled from the same can as another's—but the only link between two men's bread is our enemy, the fly. If the one has a communicable disease the fly, forgetting all about quarantine, travels with his saddle bags loaded with germs from him who hath to him who hath not.

And on top of this there is the esthetic side. Is it not inconsistent to have bathtubs and clean linen and all such refinements and eat fly-befouled food?

Read what Hurty of the Indiana State Board of Health says about it:

FIG. 390.—PARASITE TICKS ON THE BODY OF A HOUSE FLY.

JOURNAL OF A FEMALE HOUSE FLY

Thursday, Nov. 2, 1911—Went into winter quarters. Barely lived through the long, hard winter.

April 20, 1912—Came out of winter quarters and laid my first batch of eggs—120 in number—in a manure heap.

April 21, 1912—My first 120 eggs have hatched.

April 22, 1912—Larvae have undergone first molt.

April 23, 1912—Larvae have undergone second molt.

April 26, 1912—Larvae transformed into pupae.

May 1, 1912—One hundred and twenty full-grown flies, sixty of which are females.

May 3, 1912—Laid my second batch —120 eggs.

May 13, 1912—One hundred and twenty flies came from my second batch of eggs. Laid my third batch in a kind neighbor's garbage can.

Iowa Health Bulletin.

FIG. 391.—FLIES—MILK.

May 20, 1912—The city has offered a prize to the school child who will kill the largest number of flies. The boy at the house where I live is killing flies right and left. And to think—we have all been eating at the same table with him.

May 21, 1912—Laid my fourth batch of eggs. Left alone and unhindered, by Sept. 10, 1912, my descendants will number 5,598,720,000,000.

FLY CATECHISM

Where is the fly born? In manure and filth.

Where does the fly live? In all kinds of filth and he carries filth on his feet and wings.

Where does the fly go when he leaves the manure pile and the spittoon? He goes into the kitchen, the dining room, and the store.

What does the fly do there? He walks on the bread, fruit, and vegetables; he wipes his feet on the butter and he bathes in the milk.

Does the fly visit patients sick with consumption, typhoid fever, and cholera infantum? He does and he may call on you next carrying the infection of these diseases.

What diseases does the fly carry? Typhoid fever, consumption, diarrheal diseases, diphtheria, scarlet fever, and, in fact, any communicable disease.

How can the fly be prevented? By destroying all the filth about your premises; screen the privy vault, cover the manure bin, burn all waste matter, destroy your garbage, screen your house.

Either man must kill the fly or the fly will kill man. Prevent the fly.

FLY FAMILY DESCRIBED

The Connecticut experiment station has made some tests to determine how thickly populated with germs are flies from different places. To begin with, our old enemy, the blue bottle fly, is not much of an enemy after all.

In addition to being so shy as to be harmless he is not thickly populated. He only carries 300,000 germ passengers. Swill barrel flies average about 3,000,000, pig pen flies about 1,000,000 and dwelling house flies nearly 900,000.

Swill barrel flies, pig pen flies, and dwelling house flies are the same species of insect. The only difference is in the degree of dirtiness. It is the difference between a man before and after his bath.

Flies engaged in eating in a pig pen or swill barrel are working at a dirty trade. When the fly travels the swill barrel course to the house to finish his dinner with dessert taken from the table he is working at a cleaning trade, and for his desire to top his meal and incidentally to clean himself, Mr. Fly cannot be blamed. The blame rests with the people who are willing to drink the fly's bath water.

The fly is a most voracious eater. We have heard that he is a most appalling breeder but his gastronomic ability has not had much notice. A satiated housefly, preening himself on a piece of pie, weighs nearly twice as much as when he began to eat. When fed plenty of moist food he deposits a fly speck every five minutes.

Anything is grist that comes to his mill. He will eat anything as well as everything. Because sputum is from a case of consumption or secretions are from a case of typhoid is no reason why they do not appeal to the fly's palate.

Being fond of filth as well as of clean food and being fond also of dirty places naturally they have many germ diseases of their own.

There are epidemics affecting flies as well as epidemics affected by flies. But what matters it if a few millions are killed by germs when so many millions can quickly breed? Nothing with the feeding and breeding power of a fly is at any great disadvantage from germs. It is the human being that expects to produce but a few of its kind that must fight off the enemies to keep the race alive.

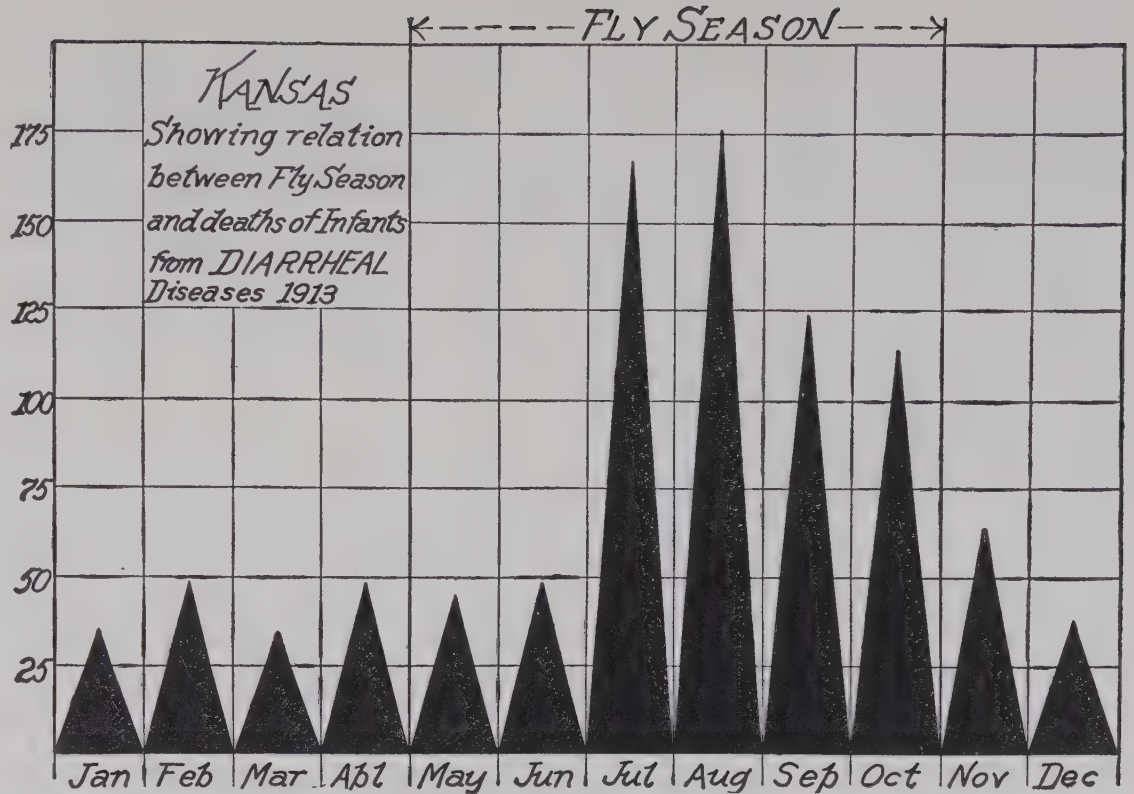
In fighting flies it is most important to concentrate attention on fly breeding places. Next in importance come fly feeding places. Flies require such an enormous volume of food that we can accomplish something by keeping things free from fly food. Most important is care of the garbage—no garbage on the ground, a clean can well covered and frequent removal.

But efforts toward diminishing fly food should not stop at garbage. Exposure of foods to the flies in stores must be stopped. Confectionery, fruits, vegetables, meats and general bulk groceries must not be exposed. In some states, laws covering this point are enforced. In others they are a dead letter. What's the use of fly posters and widely heralded fly campaigns if the law relating to fly food is not enforced?

OPEN SEASON FOR FLIES

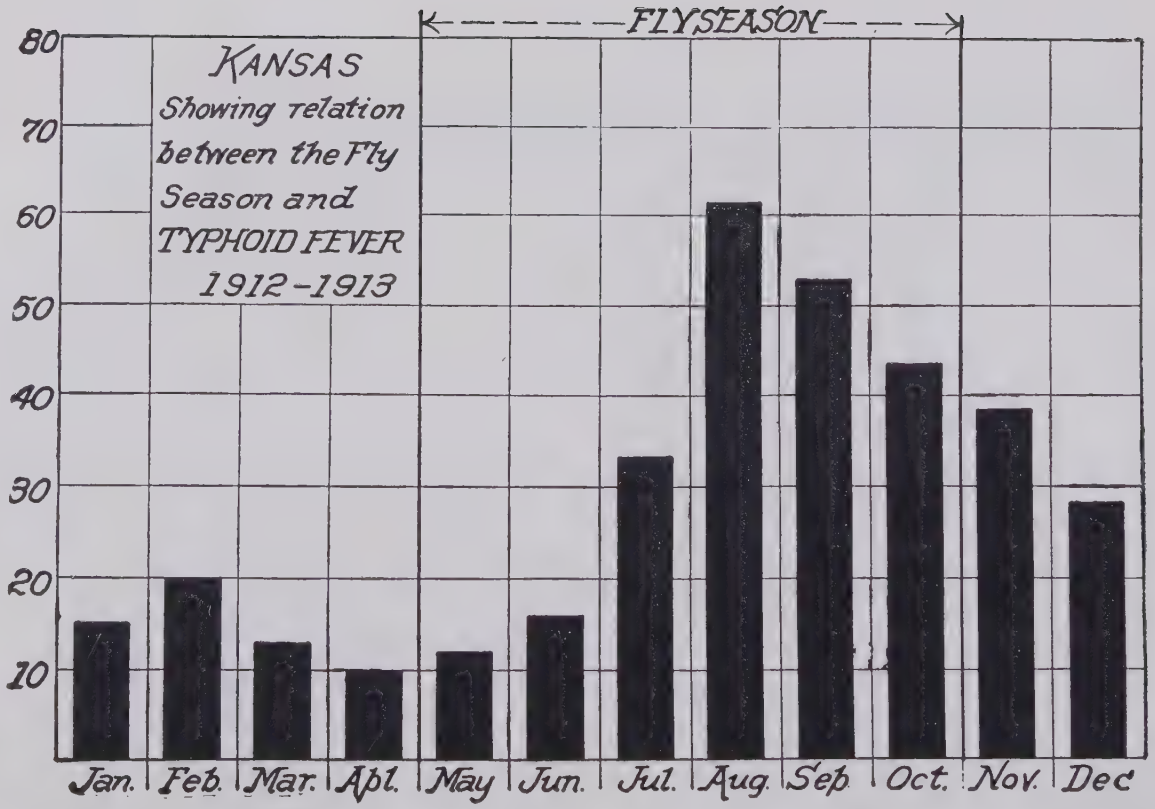
A female fly begins to lay eggs when ten to fourteen days old and it takes the young nine or ten days to pass through the various stages from egg to house fly. It takes about three weeks therefore to complete a generation—from egg laying to egg laying.

In order to spread typhoid bacilli flies must have access to the excretion of those having typhoid fever or carriers of typhoid bacilli. Therefore



Kansas State Board of Health.

FIG. 392.



Kansas State Board of Health.

FIG. 393.

the number of chances for flies to pick up infection increases as the season goes on.

A typhoid laden fly does no harm so long as he stays out in the grass, but when the cold night season arrives the house fly fits his name. For these reasons there should be no let up on the fly campaign. Another reason for continuing the effort is to lessen the number to be carried over into each succeeding year. There should be fewer flies hatched each year. Every one killed, therefore, represents a decrease in the supply.

PREVENTING FLY BREEDING

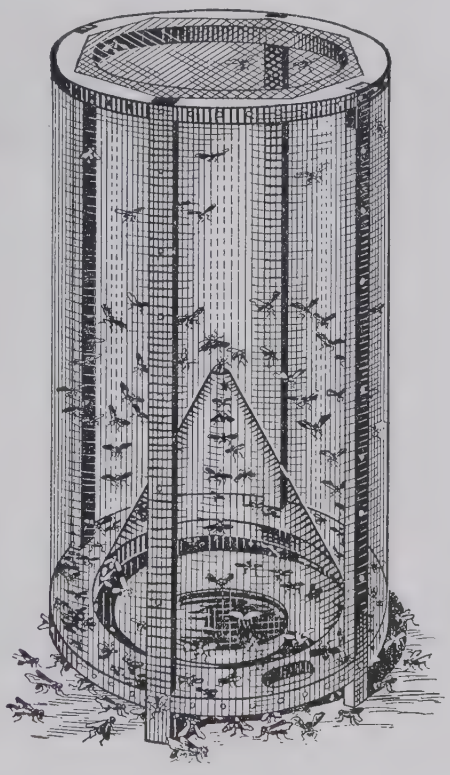
The fight against flies began with the slogan "Swat the fly." Fly swatters, fly paper, fly poison, and fly screens are in general use. It was soon seen that something else was needed. The next step was the general use of fly traps in places not well adapted to screens, fly paper, and fly swatting.

As I go around the country I find that the use of fly traps in the vicinity of fruit and vegetable stands, around milkhouses and some other places widespread. As one walks along the business streets in small cities two or three fly traps are found on each block.

Redlands, California, has gone a step further. It has appointed a special officer whose duty it is to look after the fly traps, to keep them baited, cleaned, and generally in order.

Iowa State Board of Health.

FIG. 394.—FLY FOOD.



Virginia Health Bulletin.

FIG. 395.—GIANT FLY TRAP.

We are just beginning to work out methods to prevent flies from breeding. Some ordinances requiring that manure boxes be made flyproof have proved a disappointment. Just now special stress is being put on treatment of manure in the box to prevent flies from breeding in it.

The Department of Agriculture has just promulgated the following method. Powdered borax is sprinkled over the manure at intervals of five

days. The quantity used is .62 of a pound to eight bushels of manure.

Forbes recommends the use of a solution of iron sulphate two pounds to one gallon of water per horse per day. The University of Wisconsin recommends the use of arsenic.

In Bulletin No. 14, Bureau of Entomology, Department of Agriculture, Hutchinson says that when manure is so spread out that it rapidly dries out

I GOT 'EM! I GOT 'EM!
THREE HUNDRED AND FIFTY MILLION OF 'EM!
EXTRA! PAPER EXTRA!
SWAT THEM EARLY!
IT IS ESTIMATED THAT EVERY FLY THAT IS PERMITTED TO LIVE UNTIL FALL WILL HAVE ABOUT 350,000,000 DESCENDENTS BY THAT TIME.
RALPH WILDER

Chicago Health Department.

FIG. 396.

flies will not use it as a place in which to deposit eggs. The department recommends that manure be scattered on the fields and thus be rapidly dried out. This is even more effective than treating it in boxes with borax, iron sulphate, or Paris green.

Hutchinson found that fly eggs were found in the moister part of the pile; that the larvae there hatched but that after a while the larvae sought drier areas to change to pupae; that neither larvae nor pupae would remain in a light place; that they could not stand heat; that they avoided the moldy parts of the manure pile. It was these qualities that made it impossible for flies to hatch out of manure that had been scattered on the ground.

DEFENSE AGAINST FLIES

Sometimes it is not possible to do the best thing nor even the second best thing; whereupon it becomes increasingly necessary to do the third best thing.

The best fly preventive is to prevent fly breeding. The second best is to keep things so clean as to prevent fly feeding. The third best thing is to defend oneself against the flies that have come. Sometimes it will be possible to screen them away. This works well enough with dwellings. The few flies that get into a well screened house can be swatted, or caught with paper, or killed with poison.

Where the doors are opening constantly screens are sometimes of little service and sometimes none at all. Under these circumstances what is to be done?

Usually it will be possible to protect the food supply with cases, screens, or mosquito bar. Anything kept in the icebox will be protected. Flies suddenly entering an atmosphere of 60° will escape if they can. If not, they slow up. At about 48° they lose their ability to fly. At 27°, five degrees below freezing, most of them die.

The best method of ridding a dairy barn, milk house, or store, of flies will depend on the number present and on other considerations. When flies are abundant the use of fly traps is the most effective method.

Sticky fly paper has some advantages and some disadvantages. A few saucers containing a mixture of one pint of water, one tablespoonful of formaldehyd (commonly known as formalin), and one tablespoonful of sugar will be efficacious, if not much water is exposed in the room.

The proposers recommend that pieces of bread saturated with this solution be placed in plates and these exposed in places inaccessible to children and domestic animals.

When the place is not being used it should be darkened whereupon fly paper, fly traps, or fly poison, placed near an undarkened window, will be doubly effective.

WHY HAVANA IS FLYLESS

There are no flies in Havana. The temperature does not go below 54°. Therefore flies could multiply all winter long. The people eat in the open. Therefore there should be plenty of fly food. The smaller towns have flies in abundance. Nature has done its share to provide flies for Havana. Why, then, is Havana flyless? Because man has done enough to protect himself. Obviously what Havana has done any American community can do.

What has been done? The city has been made clean. The streets are clean. The homes are clean. Nothing is thrown on the ground in Havana. The courtyards as well as the floors are kept immaculate. The manure of livery stables is deposited without delay in a cart.

At 10 o'clock each night all wastes are hauled out by the city. This includes stable manure, garbage, street sweepings, and rubbish. At 12 o'clock begins the sweeping and washing of the streets. The street cleaning is not done until after the manure wagons and garbage wagons have passed on.

When there recently I went into the poorer parts of the city looking

for dirty streets. They were not to be found. I investigated the floors of homes and the flagging of interior courts and found that cleanliness prevailed. I thought surely the stables would be found below standard. So I went there and found the same observance of sanitary law.

No doubt railroad trains and vehicles bring flies into Havana. And an occasional fly is seen. But none breeds in the city and those that are brought in die.

The most important factor in this result is the perfect care of manure and garbage on the premises and their daily removal. The next factor in importance is the cleanliness of the streets and homes.

STABLES AND FLIES

The object of this article is to call attention to two important phases of a fly prevention campaign, to wit: a campaign against fly food—in other words, a campaign for clean houses and premises; and a campaign against fly breeding places—in other words, a campaign against bad stable conditions.

Drs. Porter and Byrd of Florida have reported the result of a study of one hundred and thirteen stables in Jacksonville. They found that chickens around a stable were a help. They ate fly eggs and grubs.

If the stable floor was not perfect they always found eggs or larvae. A well dressed cement floor without cracks was the ideal. Practically all of the wooden floors were breeding places. Either the female would get through a crack and lay her eggs in the dark space below or else bits of flyblown manure would fall through the crack. Cement floors were also liable to crack but the liability that flies will find them a breeding place is small compared with wooden floors.

Worst of all was the record of the earthen floors. When the ground of the stable floor was hard and dry throughout no larvae were found; but where a part of the earth floor was soft and moist, larvae were found in those parts of the stall floor that were dry and hard as well as in the soft parts. The examination was made by digging up and examining the top six inches of the ground.

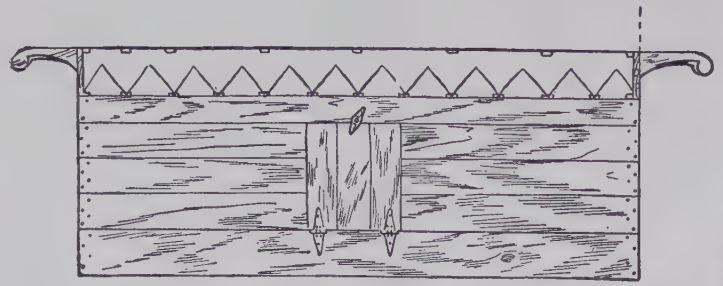
It is next to impossible to prevent flies from breeding in a stable unless the floor is tight, dry, well drained and properly constructed. Taking care of the manure pile is easy though even more important. It must be flyproof. Furthermore, the manure box must be emptied once a week. It takes flies ten days to develop from mother through eggs, larvae and pupae into flies. To empty the manure box every week is to kill most of the young and to get the balance away from your neighborhood though you may be harming the neighborhood where you dump them.

FALL FLY DANGER

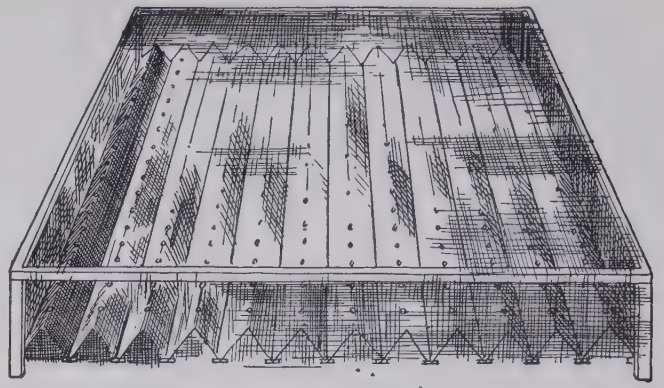
There are many women who advocate the double standard for their homes—one for bugs and another for flies. There are other women who run their homes on the single standard—no bedbugs and no more flies than bedbugs. Those single standard women boast of their homes during this summer season. They worked on the theory that the flies came in the house for food. They kept their homes so clean that the flies found more food outside than

Plan for the 'Swain' Manure Bin and Fly-proof Cover

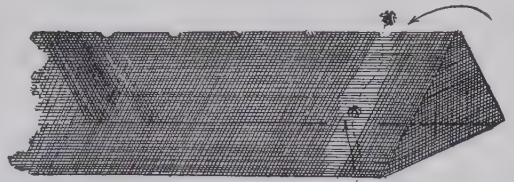
DRAWN BY
Chas. W. Van Osten



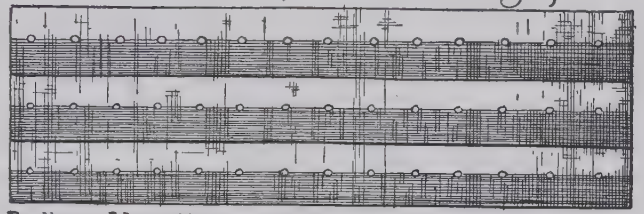
Front Section of Bin and Cover.



View of the Fly-proof Cover
Showing Method of Screening



Detail of One Gable Showing Fly Exits



Bird's-eye View Showing Section of a Series of Gables.

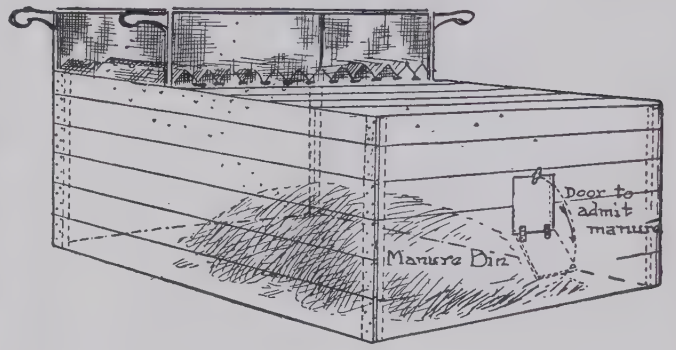


FIG. 397.

Florida Health Notes.

in, and, therefore, did not try to find holes in the screens or to get in through open doors.

As the weather begins to get cool they find that their plan does not work so well. The reason is that the flies are now seeking the house for another reason; they want to keep warm. A clean house is nearly as much sought after as a dirty one.

When the temperature falls well below 70° flies suffer greatly. They become stiff in wing and leg and they move slowly. When the temperature gets about 50° they cannot move at all.

In controlling disease health officers try to push back the contagion little by little until the foci of infection are few whereupon they redouble their efforts and try to bring about its disappearance.

Flies in October have reached the stage where they could be made a disappearing plague. The August effort to control, if duplicated in October, would make them disappear.

Therefore the single standard housewife should get out her swatter and her flypaper for October.

The double standard housekeeper has had hers out all summer. She probably notices fewer flies in her house now than in August. If she stops swatting because the flies are fewer she will have to do more swatting next year.

She should proceed upon the plan health officers have worked out for contagion: To double the effort as the enemy decreases and success becomes possible.

There is another reason for keeping flies out of the house in October. Summer flies, living in the grass, are not so liable to be spreading typhoid as fall flies.

Flies spread typhoid. They do not originate it. They can only spread it when it is around.

Typhoid is a fall disease; therefore be doubly afraid of flies in the fall.

HOW TO AVERT FLY MENACE

Flies spread disease. So much has been said on this subject that everybody knows it to be true. Flies do not abound in a clean house. If there are many flies around it is certain that the house is not clean. These facts are known by everybody and nothing is gained from discussing them further.

The fact next to be stated is that in order to prevent flies from multiplying it is necessary properly to control the manure situation. Before many years cities will remove stable manure as they now remove garbage. Havana is a flyless city, likewise a healthy city, because it has adopted this as one of the functions of the city government.

Next in importance to the prompt removal of stable manure is the treatment of it with chemicals. In Bulletin No. 118 the Department of Agriculture gives the advantages of the different chemicals used for destroying fly larvae in stable manure. They recommend borax. The method is as follows: Use ten ounces of borax for each ten cubic feet (eight bushels) of manure. Sift it on the fresh manure with flour sifter and then sprinkle with two or three gallons of water.

This will kill the larvae and eggs. It will not decrease the fertilizer value. The cost will be 1 cent per horse per day.

They found that calcined colemanite ranked second. Colemanite is the crude borax mined in California. This is heated to a white heat and the product is known as calcined colemanite. It is used in the same manner as borax but the quantity required is somewhat larger (twelve ounces to ten square feet). The cost is about one-quarter of 1 cent per day per horse. Colemanite does not lessen the fertilizer value of manure.

FIG. 398.—FLIES ALL OVER TOWN.

Calcium cyanamid was found to be fairly efficient. Twenty pounds to eight bushels of manure killed 99 per cent of the larvae. Four pounds killed 40 per cent of them. Calcium cyanamid increased the fertilizer value of the manure.

Sodium fluorid was somewhat efficient. Formaldehyd was moderately effective. Paris green was fairly efficient. The fact that Paris green is a poison was against it. Iron sulphate, salt, kerosene, pyroligneous acid, canal larvacide, kainit, copper sulphate, lime-sulphur mixture, potassium cyanid and ammoniacal gas liquor were tried and found ineffective.

HOUSEHOLD FLY TRAP

The United States Department of Agriculture, Bureau of Animal Industry, gives these directions for a household fly trap six inches in diameter and twelve inches high:

"Buy two sets of six inch embroidery hoops. Use two of the small and one large hoop for the trap. Tack twenty inches of twelve inch wire screening on the inside of the smaller hoops. The cone requires twelve inches of twelve inch wire screening cut in a half circle, with a six inch radius to the circle. Lace the selvage edge of the screening together with wire or linen thread. Tack the circular edge of the screening on the inside of the lower cylinder hoop. Cut a hole one-half inch in diameter at the top of the cone. Cover the cylinder with a piece of cloth held in place with the large embroidery hoop. Place trap over a bait of sugar and vinegar, high enough from the table to allow flies to get underneath. Clean the trap by scalding the flies, removing the cloth, and shaking the dead flies into the fire."

A NEW FLY TRAP

Levy of Richmond found that, while fly eggs were laid in stable manure whenever possible and there hatched, the maggots would crawl out of the manure and burrow in the ground to pass their pupa stage there. He conceived the idea of adding a new trap to the list of fly traps, one to catch the larvae as they sought to escape from the manure.

He got a whisky barrel, bored some holes in the bottom, set it on bricks in a tub, and filled it full of manure.

The next day larvae began to drop through the holes into the tub. After about a week the manure was emptied from the barrel and carefully examined for larvae. None was found.

Then an improvement was made. The end of the barrel was knocked out and a piece of gauze with a quarter-inch mesh was substituted. This worked better because the larvae could get out.

Levy's practical suggestion is that manure boxes be made with perforated bottoms; that they be set in a tank containing an inch or more of some poison, such as a solution of Paris green or of sulphate of iron, and that this be covered by a close-mesh gauze or that it be kept oiled to keep the mosquitoes away.

Levy says that flies lay in manure before it leaves the stalls. All fly manure must be regarded as fly borne; that where the manure box is set flat on the ground or in the ground removal should be twice a week, because from egg to larva—old enough to crawl—requires but three days and therefore when the box is emptied the pupae will be left behind in the ground to develop into flies in course of time.

Another point made is this: Not all of the larvae escape from manure. The ordinary box does not lend itself perfectly to such escape. The farmers sometimes object to manure from the cities because it increases the number of flies and the flies trouble their stock. In fly time the horses get thin and the cows give less milk.

Levy's suggestion is that if the box has a perforated bottom the larvae will escape and the manure will not develop so many flies to plague the farmer's stock.

This suggestion of Levy is not to replace fly traps, fly poison or swatters. It is only an additional agent.

I am sure that the number of flies in the cities is getting materially less. There is some improvement in the country.

The more recent movement directed against fly food and fly breeding places is much better than the fly swatting with which the anti-fly movement began.

DOOR FANS FOR FLIES

In De Kalb, Illinois, there is a saloon with a large wooden blade electric fan outside the front door. It is suspended from the roof of the vestibule of the open corner entrance. It serves a double purpose. Flies do not like a windy place. As the outside of the screen doors is kept free from flies the number finding entrance to the interior of the saloon is greatly reduced.

In the second place the cool, well fanned saloon is inviting in hot weather.

I had never seen or heard of this method until the July number of the North Carolina Bulletin of Health came to hand. Some tarheel restaurant keeper had beaten the De Kalb saloonkeeper. Dr. Booker writes that the

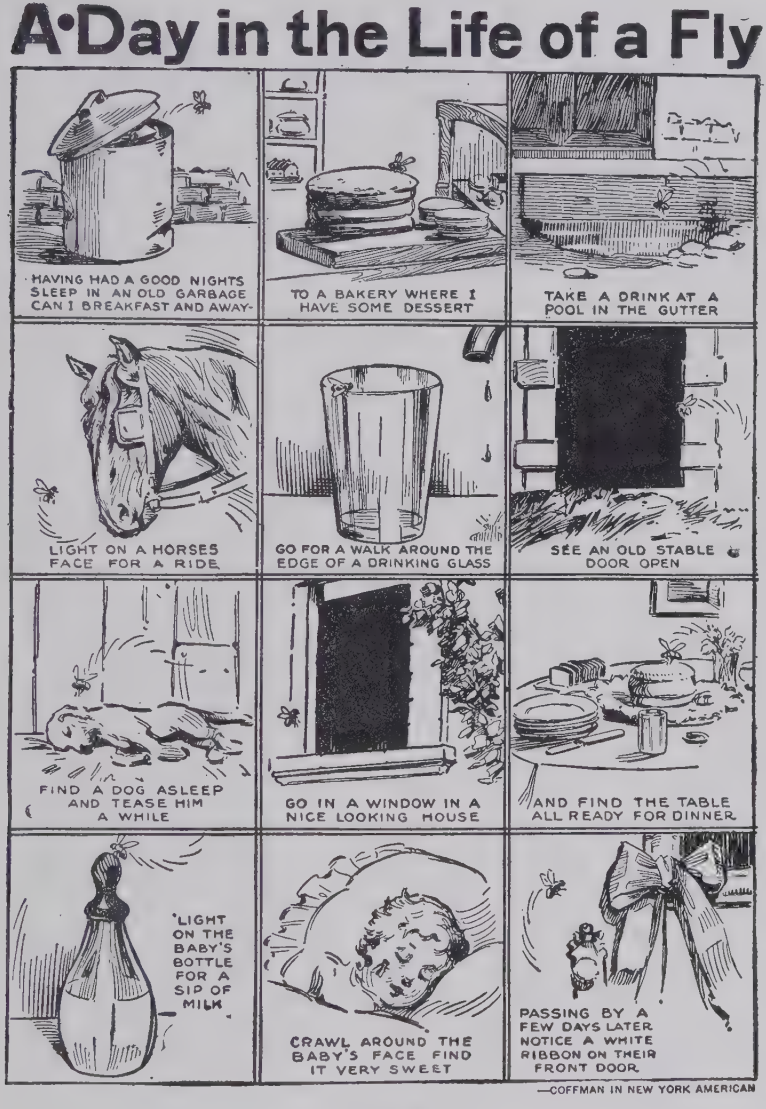

A Day in the Life of a Fly
HAVING HAD A GOOD NIGHTS SLEEP IN AN OLD GARBAGE CAN I BREAKFAST AND AWAY-
TO A BAKERY WHERE I HAVE SOME DESSERT
TAKE A DRINK AT A POOL IN THE GUTTER
LIGHT ON A HORSES FACE FOR A RIDE
GO FOR A WALK AROUND THE EDGE OF A DRINKING GLASS
SEE AN OLD STABLE DOOR OPEN
FIND A DOG ASLEEP AND TEASE HIM A WHILE
GO IN A WINDOW IN A NICE LOOKING HOUSE
AND FIND THE TABLE ALL READY FOR DINNER
LIGHT ON THE BABY'S BOTTLE FOR A SIP OF MILK
CRAWL AROUND THE BABY'S FACE FIND IT VERY SWEET
PASSING BY A FEW DAYS LATER NOTICE A WHITE RIBBON ON THEIR FRONT DOOR
—COFFMAN IN NEW YORK AMERICAN

FIG. 399.

number of flies in the dining room was reduced to almost none. The owner had found that the arrangement keeps the flies out and serves as a first class advertisement.

The bulletin says: "Grocers, butchers, bakers, confectioners, hotel and restaurant keepers will undoubtedly find the advertising value of such an

arrangement worth considering, and in a short while the general public will be demanding such protection."

STABLE FLIES

When Rosenau discovered that stable flies could carry infantile paralysis the interest in this fly increased materially. The farmers already knew of the harm from this fly. In addition to spreading infantile paralysis Jennings and King of the Bureau of Entomology say it may spread pellagra. The diseases of domestic animals spread by it are anthrax, swamp fever, glanders, septicemia, surra, souma and, maybe, round worm.

In addition, biting flies worry stock so much that they cannot work efficiently. Animals get thin and milk cows sometimes go off 40 to 60 per cent in the amount of milk produced.

F. C. Bishopp of the United States Bureau of Entomology tells in Bulletin 540 what he has learned about the stable fly. It breeds largely in straw. Old strawstacks in the fields are the worst offenders. Bishopp's advice is to burn these stacks or else to spread the straw and plow it in deep. When a heavy rain falls on freshly thrashed straw conditions for fly breeding are at their worst. Manure containing straw is another breeding place of importance.

To keep the flies off, Bishopp advises a mixture of fish oil (one gallon), oil of pine tar (two ounces), oil of pennyroyal (two ounces), and kerosene (one-half a pint). To keep the flies out of the stable he recommends the Hodge window trap.

DO NOT REMOVE YOUR SCREEN

This is being written on November 1 in Chicago. We have had one blinding snowstorm lasting for more than half an hour. Heavy killing frost has occurred several times during the last month. During the first half of the month there was a week of rather continuous cloudy cold weather with several heavy rainstorms. The grass and weeds are dead.

The screens were removed October 29. Prior to that time whenever a lone fly secured entrance to the house the scouts located him and the cavalry speedily demolished him by the swatter route. Today the rooms are full of flies and swatting seems an endless job.

In spite of the most persistent effort some females will find warm recesses in which they will remain until more propitious weather next spring. Had the screens remained on another month all the outside flies within a few hundred yards of the house would have been killed and our next fly fighting job would have been far lighter. After fighting all summer we surrender a considerable part of the vantage gained through one mistake.

I have not seen any mosquitoes lately nor heard of any. It is fair to assume that the lady mosquitoes needed to perpetuate the species for next year are now under cover in this latitude. Those mosquitoes not in out of the cold are dead and are therefore good mosquitoes.

From the mosquito standpoint in the latitude of Chicago it is safe to remove screens as early as November 1. South of the latitude of Memphis screens should not be removed during the winter. While the temperature is much of the time well below that at which flies are killed and far below

that at which mosquitoes are destroyed removal of screens is not advisable.

Insects show a good deal of intelligence and forethought at least in elemental things. Perhaps they intuit, and Bergson tells us that "intuits" "land the goods" while "intellectuals" speculate and freeze.

A few flies (and perhaps a few mosquitoes) get into warm places on warm walls, live through the frosty night and then, the day having warmed the air, seek out a warm indoor place in which to hibernate. I have often seen a fly infested Pullman running through a section of the country where the ground was deeply covered with snow. Even though all the flies and mosquitoes of a given town had been killed off by cold railroad trains loosen refugees that must get indoors or die.

Flies and mosquitoes do little harm in winter. But winter provisions against them return many fold. It is easier to kill the one female in cold weather than the millions of its descendants in warm weather.

WHO HAS A NEW FLY SLOGAN?

What is the matter with "Swat the fly"? It is short, easy to say, slangy, suggests action and furthermore it has been accepted. For a woman who will have no flies in her house, who wants to protect her baby, who will not stand for flies in the milk—for her "Swat the fly" is an ideal slogan. It is possible for her to kill every fly that crawls through her screens.

However, the grocer, the butcher, and the dairyman cannot swat the fly in their places. The best they can do is to limit the number. The ideal slogan for them is "Trap the fly."

Flies have but few impulses. One is the impulse to eat; the other is to propagate. The spreading of disease by them is purely an incident. There is no impulse about it. There is no intent, no malice. They go in search of food and incidentally they become covered with filth. They move on in continued search for food and incidentally they infect milk, butter and bread with filth and disease.

Now the impulse to eat is a force to be reckoned with. Flies come around because fly food is about. There is no more attractive fly food than garbage. Any dirty place is a fair pasturage for flies. In a certain sense a better slogan would be "Starve the fly."

None of these procedures, though, is sufficient; nor are all of them combined. A woman can keep swatting the fly and keep her house flyless. A grocer can trap the fly and keep his store clear enough of flies to attract desirable customers. Careful, cleanly people can keep things clean enough to starve the fly.

However, none of these nor all combined can make a flyless town. In order to have a flyless town it is necessary to plan against that other great impulse—the impulse to propagate. Years of experience prove that the only fly campaign which can result in a flyless town is one which removes the fly breeding places.

The fly situation can be controlled if one type of fly breeding place is eliminated. That is horse manure. A daily removal of all horse manure has made Havana a flyless town. Santiago de las Vegas, twenty miles away,

has as many flies as Memphis, Tennessee. A weekly manure service 100 per cent perfect in warm weather would solve the problem.

To get this done we must have laws. To have laws we must have public sentiment. To have public sentiment we must get everybody to talking about it. For this we need a slogan. Who has one? It must be short and easy to say. It must tell enough but not too much. It must carry the essence of the idea but not too much of it. It must suggest action. It must affirm. If it is slangy, so much the better. Who has it?

Case Against Flies Proved.—*Mrs. E. H. S. writes: "If house flies are transmitters of disease, why were the periodical visits of cholera to the United States distinguished by their absence, so much so that forecasts for the coming of the dread disease were based on the presence or absence of these insects?"*

Reply.—House flies are transmitters of disease. That has been proved by positive and incontestable evidence. I do not know why the epidemics of cholera fifty years or more ago were preceded by absence of flies, if they were. My opinion is that they were not. It is so easy for such loose statements to start and when the facts are half a century in the past it is impossible to run them down.

Plague of Small Flies.—*Desperate writes: "Four years ago I moved into a house where small flies collected around the sink and in the bathroom and I have tried every means of getting rid of them without success. I had diphtheria and the house was fumigated, but I still have the flies. Can you tell me what is the cause? I never leave anything around that would cause them to come, and I never have one of the ordinary flies, just those water flies."*

Reply.—Generally this kind of fly keeps away from food. Therefore, they are not of importance as disease spreaders. Fumigation with formaldehyd does not kill insects. These flies breed in soggy wood. Burn pyrethrum powder (insect powder) around the sink and bathtub; spray the woodwork of the sink and bathtub with Platt's chlorids. Use an abundance.

To Get Rid of Flies.—*D. H. W. writes: "Can you tell me some method of ridding a small community of flies? As the summer advances they gather in clouds around the kitchen doors and stables. We have tried every known device."*

Reply.—1. Enforce proper care of stables as breeding places by (a) having manure boxes emptied once a week; (b) screening manure boxes; (c) having proper floors in stables; (d) screening stables.

2. Enforce such cleanliness as deprives flies of food. (a) Through garbage being wrapped in clean, covered cans; (b) through keeping garbage off the ground.

3. Keeping flies out of the house by (a) screens; (b) swatters; (c) fly paper and fly poison.

4. Pay proper attention to butcher shops and creameries.

5. Regulate or prevent dumping.

6. Education by posters, fly campaigns, lectures, and by talking flies instead of the weather.

Bothered By Flies.—*Mrs. D. J. H. K. writes: "Please tell me how to keep flies out of a screened porch, or get rid of them, as we are compelled to leave the door open in order to run the washing machine on the inside with a gasoline engine on the outside."*

REPLY.—Catch them in traps and on fly paper. Around a washing machine fly poison would not be of much service—the flies get plenty of unpoisoned water. Fly repellants are of little service.

Smudge Plan to Kill Flies.—*S. B. writes: "Kindly let me know if there are any chemicals or other substances that can be mixed and burned, the odor of which kills flies, mosquitoes, etc., and if there is such a preparation that I can make or mix, will it be possible to have a pleasant odor and not objectionable to people in my place of business?"*

REPLY.—Insect powder slowly burned after a smudge plan stupefies flies and mosquitoes and they can be easily killed or swept up and burned. The odor is not unpleasant. Sulphur burning makes fumes which kill insects; but the fumes are highly objectionable. Neither should be relied on. The only way to keep out flies and mosquitoes is to screen them out. As to flies, no fly food should be left around. As to flies and mosquitoes breeding places must be abolished. Burning powders helps a little.

Try Burning Sulphur.—*B. writes: "Will you kindly advise me how to rid my basement of small flies? I have tried chlorid of lime and sticky and poisonous flypaper without success. They are not the ordinary house flies, but I believe have hatched out from eggs laid in cordwood which was stored in my basement last winter."*

REPLY.—This small fly is found rather frequently around houses. Censuses show that they make up from 5 to 15 per cent of the house flies. They spread no disease so far as is known. They are not killed by ordinary fly killing procedures. Try sulphur. Close all openings and burn five pounds of sulphur for each 1,000 cubic feet of air space. At the end of eight hours let the fumes out. Then clean up thoroughly or a new crop will breed within a month.

How to Bar Flies.—*J. A. S. writes: "1. What is the best way to dispose of horse manure so that it will not breed flies? 2. Will sprinkling with crude oil do any good?"*

REPLY.—1. Keep the manure box screened so that flies cannot enter. A female ready to lay will find a hole in an ordinary cover. Empty the box once a week in warm weather. In early spring and late fall once every two weeks is often enough.

2. The danger from fire is too great when oil is used. Forbes recommends that manure be sprinkled with a solution of iron sulphate. He advises two pounds dissolved in one gallon of water for each horse each day.

Iron Sulphate and Water.—*H. F. writes: "Please give the formula for a preparation to put on manure to prevent flies from breeding in it, but not to destroy the fertilizing qualities. We keep two horses."*

REPLY.—Dissolve four pounds of iron sulphate in two gallons of water. Sprinkle this over the manure and the floor of the stalls, if of dirt. The above is the quantity required each day for a two-horse stable.

To Get Rid of Ants.—*G. A. C. writes: "Can you suggest any means of getting rid of small ants? They have infested our refrigerator and kitchen all of a sudden."*

REPLY.—The following are methods recommended by the Division of Entomology, Department of Agriculture:

First, see that all food and especially sugar and sweets is in tightly closed receptacles. Moisten sponges with sweetened water and place where the ants are most numerous. Collect the sponges several times daily and immerse them in boiling water, which will kill the ants.

Also use a sirup of boiling water with borax and sugar dissolved in it

The odor of camphor is distasteful to ants and gum camphor loosely wrapped in paper will often drive them away.

Another method recommended is to fill a bottle (partly) with sweetened water; make a hole in the cork large enough for the passage of a single ant; run a thread moistened with the sweetened water from the floor through the cork. When once within the bottle the ant is gorged with food and cannot get out.

Bedbugs.—*M. A. C. writes to know if anything can be done in a community way about bedbugs. He has found them frequently in newspapers as delivered and in books as they come from the public library.*

REPLY.—Bedbugs are of no particular health importance though of course they are highly objectionable. I don't know what department of the city government would undertake to get rid of them. The public library can do nothing. The bugs can get into the books and papers only from the persons of the readers.

To Get Rid of Fleas.—*Mrs. H. W. A. writes: "Three kittens deserted by their mother before they were able to care for themselves acquired a fine collection of fleas. As soon as the cause was discovered the survivor was chloroformed. This was over two weeks ago, but the furnace room, the only place they were in, seems to be still infected. There are no other animals about the house, but the fleas appear to be spreading. What can we do to be rid of them?"*

REPLY.—Old floors, mattings and carpets favor the development of the flea. Places frequented by them should be thoroughly cleaned, using boiling water or dusting with pyrethrum powder, especially in the crevices or cracks. A decoction of one ounce of pyrethrum powder to one gallon of water boiled for ten minutes filtered and strained and sprayed into the infected places helps. Sprinkling with benzin is helpful but of course is dangerous, as benzin is highly inflammable.

Fungus on Insect.—*S. A. H. writes: "I killed a large fly in the house recently. Noticing a lump formed on its body, I found it to be a mass of little worms, just visible, when single, on glass. Was this part of the generating process, as with ticks, or was it some parasite or foreign larvae?"*

REPLY.—I judge the mass was composed of a fungus—empusa.

This fungus destroys many flies during the latter part of the season.

To Get Rid of Mosquitoes.—*E. K. writes: "Kindly tell me the best way to get rid of mosquitoes. Our basement, although dry and sanitary, harbors a flock of them all winter, and has for the last two or three years. Even in the bedrooms and bathroom there are a few stragglers that hide in*

and around picture moldings and other out of the way places and come out whenever we have a warm spell."

REPLY.—Make a careful search of your house and you will find somewhere a bucket or pan of water in which mosquitoes are breeding. Upon close examination you will find wiggletails. Such accumulations of water must be emptied or else treated with a mixture of kerosene and crude oil, half and half. The oil treatment must be repeated at two-week intervals.

The mosquitoes on your premises are too active for hibernators. To kill the hibernators the best plan is to freeze them out. In any room where the temperature remains at or below freezing for a few days, the hibernators will be killed.

Where the freezing method cannot be applied use sulphur fumigation. Close the room very tightly; stop all cracks; burn two pounds of sulphur for each 1,000 cubic feet of air space. Allow the fumes to act.

Insects in Flour.—*Mrs. S. R. writes: "Will you please tell me if it is safe to use flour in which there are small brown insects, which in one stage are tiny worms? Is there any way of destroying these insects?"*

REPLY.—I infer that you have got rid of most of the insects if not all of them. I should say that you would be safe in using the flour.

When flour is riddled with them it might not be safe. Certainly it would not be fastidious.

It is not an easy matter to get rid of flour weevils. The pantry and bins must be thoroughly cleaned. Use scalding water freely. Carbon sulphid, two pounds to each 1,000 cubic feet of air space, is recommended. The gas is inflammable. Cyanid gas is better, but it is too dangerous for general use.

Go to the public library and read up the subject in Herrick's "Insects Injurious to the Household."

To Get Rid of Flour Bugs.—*H. S. B. writes: "We believe that some time ago you gave a remedy for the elimination of flour bugs, which appear to thrive in flour bins and barrels. We are having trouble in this direction in our flour bin in our kitchen cabinet."*

REPLY.—Much the most effective remedy is hydrocyanic acid gas. This gas is so dangerous to human life that the method should not be used except by experienced people. Where it can be used an effective method is the use of carbon bisulphid. Stop all cracks, spray the floor, the bins, sacks, walls, etc., with carbon bisulphid. Use two pounds for each 1,000 cubic feet of air space. The gas is inflammable. Beware of lights. After some hours ventilate and then clean thoroughly. As the gas penetrates poorly it is advisable to use up or otherwise dispose of the flour in the bins before applying the gas.

When to Remove Fly Screens.—*W. L. wants to know when fly screens should be removed. Her neighbors have removed theirs.*

REPLY.—Fly screens should be removed when it is necessary to do so to put in storm windows. Storm windows should not be put in until as late in the winter as possible. Around Chicago, they should be put on about Thanksgiving; around Indianapolis, about December 15; around Kansas City, about Christmas. Around Memphis and from there to the Gulf the fly screens should stay on all winter.

This is written on November 16 on a Sante Fé train between Kansas City and Chicago. Looking out of the window, the ground is seen to be covered with snow and the ponds with ice. A fly is hovering around this writing table. There were four in the washroom an hour ago. There were fifteen flies in the washroom of the Baltimore Hotel in Kansas City yesterday. The school superintendent's office in Gary was full of flies two weeks ago. The flies which furnish the swarms of summer are those which get into the warm places for winter.

The flies which are wintering with your neighbor may get out of doors some warm day next week and later come into your house when the weather turns cold.

Flyless Havana.—*O. R. M. writes: "Cannot you print what was done in Havana by the United States government to make it a flyless city and a cleaner one than any in the States?"*

REPLY.—I have the method. It is available for any health officer or other city official who asks the Havana officials for it. Not all of it can be given in this space but certain essentials can be referred to.

The first is that the city is thoroughly cleaned every night by the authorities. There is a daily garbage removal service. The city removes the stable manure every night. After the refuse removal has been completed between that and breakfast time the streets are swept and washed. The daily removal of stable manure and garbage is the largest factor in the city's wonderful freedom from flies.

It has a mosquito brigade. Accumulations of water are drained. Pools and puddles that cannot be drained are kept oiled. The oiling brigade gets into the field almost immediately following each rain.

Keep Screens Up.—*Housekeeper writes: "The janitor of our building insists on taking out the screens in our apartment now [fall]. Is it not too early? Although I had no flies in the house all summer, I have two or three now that seem to stay."*

REPLY.—Do not allow the janitor to remove the screens until the flies have disappeared. Do not allow him to remove them now. The flies try harder to get in the house in cool weather than in hot weather. Besides, this is the typhoid season.

Moth Miller Trouble.—*Mrs. H. J. C. writes: "We have a new, well ventilated house. The sun shines in every room. Last summer we were away for several months. This spring we are having trouble with small, light colored flies. They are active, and hide in dark colored goods. They are hard to catch. When we do catch one and mash it all that remains is a mark of light colored dust. Are they moth millers? What harm will they do and how shall we proceed to get rid of them? I think we have aired about everything in the house."*

REPLY.—My guess is that you have moth millers. They are of no health consequence. Clean everything you can with a vacuum cleaner if possible. Pack woolens in moth balls. Use mothproof chests and mothproof bags.

Flies Like Electric Mixers.—*L. A. writes: "If you want to give the fly a large, healthy swat you can certainly do so by calling the attention of the public to these little electric shakers or mixers that are found at practically every soda fountain in Chicago. They are used principally in mixing sweet*

drinks, such as malted milk and frappés. Between drinks they stand exposed to the air and are absolutely unprotected from flies. I have given special notice to them almost every day for the last two weeks and I have never watched one for over a couple of minutes when it was not in action but what there were at least a couple of flies roosting on it."

REPLY.—I hope you did not buy.

Duty of the City.—*J. A. suggests that a little pan be put under the fly trap. He says: "Let us have a law to have a fly trap at every place which attracts flies. Let the city operate them in public places where necessary."*

REPLY.—The type of trap which I would advise would not be any more efficient with a tray or frying pan.

The suggestion to have a law requiring fly traps in all places where flies abound and where screens do not suffice to keep them out is most excellent, and should be adopted by the city council. The suggestion that the city operate fly traps in public places where flies are abundant is a good one, at least as far as dumps are concerned.

There are dumping grounds in the city on which a good deal of organic matter is placed. They are owned by private parties but receive some part of the public refuse. For years the city has used a fly repellant on these dumps. Experiments have shown that this repellant is of no service.

To set out fly traps and keep them in order would cost much less money than this repellant and would be infinitely more effective.

"Sewer Bug."—*J. W. W. writes: "Is there such a thing as a sewer bug, and if so, what does it look like? We occasionally find an ugly looking bug—sometimes two inches long—crawling about the walls or floors; it has numerous legs. Someone told me they were sewer bugs, and as I once found one in a stationary washbowl, it occurs to me that this may be correct."*

REPLY.—I know of no bug called a "sewer bug." Several bugs seem to prefer sewers. None of them do any harm or make themselves objectionable. When you catch another send it to Prof. S. A. Forbes, State Entomologist, Urbana, Illinois, and ask him to let you know what it is, whether it does any harm and how you can get rid of that kind of bug.

Lice In Girl's Hair.—*New York inquirer writes: "Will you kindly advise a cure for lice in a big girl's head—something drastic that would clear it readily? She has never been troubled like this before."*

REPLY.—Saturate the hair thoroughly with tincture of larkspur. Rub in well. Be careful not to let the mixture get into the eyes or into a scratch. Wrap the head in a bath towel. Leave on for six hours. Then wash the head thoroughly. Take two quarts of hot water and add one teaspoonful of carbonate of soda. Wet the hair with this mixture. Soap thoroughly with castile soap for ten minutes. Wash the soap out with plenty of warm water. If nits are abundant, repeat the above several times.

How to Remove "Nits."—*Mrs. A. P. writes: "My little girl, age 5, as a result of playing with unclean children, has become troubled with vermin in the hair, which we seem to be unable to get rid of. We have had the head washed several times and also have made frequent applications of*

tincture of larkspur and of coal oil. Still the vermin remain, as the daily use of the fine comb discloses. Her hair shows a mass of 'nits,' and the child is becoming nervous from the constant itching. The hair is naturally curly, and has been admired greatly. We naturally hesitate to sacrifice the hair, if there is any remedy we could make use of to rid it of this condition. Will it be necessary to cut off the hair, or can you suggest some remedy that will overcome this condition?"

REPLY.—Use the following: Mix equal parts of kerosene oil and olive oil. Rub the mixture well into scalp. Then cover the hair with a piece of muslin and fasten it about the head avoiding contact with a lighted gas jet or flame of any kind. The following morning the scalp should be washed with soap, hot water and vinegar. A fine toothed comb wet in vinegar should be used to remove "nits." Dry the hair thoroughly with a towel. This treatment should be repeated three or four times. You have probably failed by not being thorough enough. Follow each detail exactly.

Butter and Jiggers.—*J. W. P. writes: "Red bugs, chigo, chigro, or jiggers are a source of great annoyance in Alabama during summer and fall. What preventive can be used? Also what eradicates them after the bugs have become imbedded in the skin?"*

REPLY.—I do not know what will repel them. When I was a child the custom was to grease with butter. This was supposed to kill them.

Butter Fatal to Chiggers.—*W. F. P. writes: "How can I get rid of chiggers? How can I avoid them?"*

REPLY.—Grease the bites with butter; this will kill the chigger.

Seeks a Preventive.—*Experience writes: "For the benefit of J. W. P., I wish to state that spirits of camphor, applied once or twice, will relieve permanently the pain and irritation due to jiggers, and time will cure the marks."*

REPLY.—J. W. P. was especially interested in a preventive—something to keep the bugs from biting.

CHAPTER L

Longevity

EFFORTS OF METCHNIKOFF

Metchnikoff had heard that there were many exceedingly old people in Bulgaria. He also heard that the sour milk in Bulgaria was the sourest ever heard of.

He grew some bacilli from this sour milk and he found that they could produce about four times as much acid as the ordinary stable variety and that when the milk became extremely sour, instead of curling up and dying, they were just getting in good fighting trim. Therefore he recommended Bulgarian bacilli as a preventive of senility.

At once everybody went to it. They gained no good from it. Why? Because the manufacturer went out to the stable, scraped up any and every old acid-producing germ and flooded the market with lactic acid cultures that could scarcely sour milk, to say nothing of licking colon bacilli in mortal combat.

The people who took them did not know what they were trying to accomplish. They took lactic tablets as they were accustomed to taking quinin pills or headache powders.

The object sought is to get lactic acid bacilli to growing and fighting in one's large intestine, to make them at home there, to get oneself permanently infected with this microbe—a result that cannot be measured by the same standard as can quinin pills and headache powders.

Metchnikoff's first recommendation was that we consume a large number of live, very active acid-producing bacilli of a certain species; that this large dose be swallowed every day for a few days. The thought was that a few out of each dose would survive the stomach juices and that in a few days they would get a foothold in the large intestines and there would overgrow and kill out other bacteria. This first method, Metchnikoff now tells us, was imperfect.

BELIEF OF METCHNIKOFF

Professor Heinemann of Chicago does not think taking lactic acid bacilli will postpone old age because in the intestines there are ounces of lactic bacilli normally present.

To this the Metchnikoff school answers that the lactic acid bacilli normally present are a weak-kneed lot capable of producing only extremely small quantities of acid. Even when the Bulgarian takes enough of the strong bacilli to make 150 grams of lactic acid a day the bowel movements are but

feebly acid. The ordinary lactic acid germs do not make them acid at all.

When, as an argument for sour milk, Dr. Wiley was informed that Marie Prion who died in 1838 at 158 years of age lived for the last ten years of her life entirely on cheese and goat's milk, he replied: "That does not prove much, as she lived for 148 years on an ordinary diet and thus had already established a reputation for longevity."

While men of scientific standing were breaking their lances against the sour milk conclusions of Metchnikoff that great scientist went on perfecting his methods.

We are liable to get an idea that Metchnikoff's plan for postponing old age consists solely in the use of germs and soured milk. One who reads his "Prolongation of Life" will not be of that opinion.

In Minot's introduction to the book he says of Metchnikoff:

"One suspects that cheerfulness and optimism are in Metchnikoff inborn temperamental qualities, and, in the present volume, optimism is the dominant note."

Metchnikoff died of heart disease at seventy-two. It is impossible for him to escape being regarded as the final test of the truth of his theory.

Such a test, though, has in it the elements of unfairness. He was born in Russia where the average age at death is low. He worked his way up to a professorship at Odessa; was dispossessed of his means of livelihood by one of those peculiarly Russian happenings; wandered around Europe as an unattached scientist from 1882 to 1892 since which time he had a haven and an opportunity at the Pasteur Institute.

He was nearly sixty when he began to investigate the Bulgarian bacillus, and, at sixty, it is supposed that inheritance and experience have already determined about how long a man will live barring death from infection or other forms of accident.

Presumably for the last eight or ten years he made use of the sour milk features of his method.

Inherently and therefore since youth we are told by Minot he made use of cheerfulness, serenity and optimism as another feature of his method. Students at the Institute were accustomed to meeting him daily as he returned from market carrying his supplies in a market basket.

He made use of simple, wholesome living. We are told by the editor of "Prolongation of Life" that Metchnikoff believed in "the avoidance of alcohol and the rigid exclusion from the diet of foods that favor putrefaction, such as rich meats, and of raw or badly cooked substances."

In his book we see that he had studied everything in nature bearing on the subject; that, searching for truth, he had analyzed the life of every historical personage who attained exceeding great age, and that he contemplated death at the proper time with serenity.

He believed that in a properly developed cosmos where everything happens in its due season there will be a logical instinct of personal death replacing the instinct of personal life.

GROWING OLD GRADUALLY

If a person is between forty-five and fifty-five his average chance of dying is about 1 in 65—a little higher than the average chance of people at all ages. If between fifty-five and sixty-five his chance is about 1 in 30; if between sixty-five and seventy-five about 1 in 15; if over seventy-five about 1 in 7.

In the last census period the chance of living to full years increased materially. The total gain for men was 10.23 per cent, and for women, 15.15. The greatest gain was for girls between 5 and 9 years of age, 32.61. The greatest gain on the male side was for boys of the same age, 27.66. The gain for men was found in all groups before forty-five years of age and for women in all groups below fifty-five. The greatest loss for women was between sixty-five and seventy-five, 2½ per cent. Verily, this is the woman's century.

Dr. Dublin of the Metropolitan Life, in discussing this question before the American Public Health Association, said:

"The body at 50 is little more than what the preceding years have made it. The hereditary factor is largely overshadowed by direct influences of environment which have continuously modified the physique."

The first statement is pretty nearly true; the second requires some modification.

Studies show that those who live to be eighty and over usually belong to long-lived families. Not all the children born to long-lived families live to exceeding old age but with some exceptions only members of long-lived families are able to fight off the enemies and endure to ripe old age.

Dublin groups the reason for disease and death in old age under three heads: Scarlet fever and other germ diseases in childhood and early adult life; habits and modes of life; effects of occupation.

At the head of the diseases which trouble old people stands heart disease, with kidney disease fairly close up and apoplexy third. These diseases are largely the after effects of scarlet fever, diphtheria, measles and pneumonia.

Under habits and modes of life Dublin places the effects of venereal disease and alcohol.

Dublin says that the most important contributor to middle age mortality is the effects upon the body of the habits and conditions of work. The working conditions of organized factory work is what he has especially in mind.

That men may live out the biblical command to stay three score years and ten among men Dublin advises the following five procedures:

1. Communities must stop the epidemics among children in order to reduce the heart and kidney disease among people in the fifties, sixties, and seventies.

2. The movements against venereal disease and alcohol must be encouraged, aided and fostered.

3. We must bring about better working conditions.

4. Death certificates should be better recorded and more carefully studied in order that we may better plan to improve conditions.

5. We must heartily encourage the movement for public education on all topics connected with personal hygiene.

The above has to do with the precautions necessary to attain old age. Many are interested in knowing how old people should deport themselves in order to continue to live and to get the maximum out of life.

To continue to live the old man should proceed on the supposition that his old physique is pretty badly worn and that it requires looking over at stated intervals. Once a year, or twice, he should have his urine examined, his chest examined and his blood pressure taken.

His greatest hazard will be colds. When unfortunately he has contracted a cold with aches and fever he must go to bed and stay there until his cold has passed well beyond the fever and ache stage.

In order to get as much out of life as possible the following general plan should be carried out:

Sleep.—Saundby, in his excellent book, "Old Age, Its Care and Treatment," tells us that old people who sleep five or six hours a night get enough sleep. Nature is automatically saving. When a man has burned "toward the end of the string," nature turns down the fire.

Old people can destroy their fatigue toxins in five hours. When they wake up because they have destroyed the previous day's stock of fatigue poison the process is natural. If they want to get up at 3 or 4 o'clock, let them get up. If they want to lie in bed reading or quietly resting let them do so.

However, if the old person wakes up before the fatigue poisons have been completely burned to waste, that is another matter. For instance, if two hours after going to sleep he wakes and finds his stomach sour and the next day he has a backache or his muscles are sore he may know that his insomnia was due to poor digestion of his supper. To get relief he may take a dose of soda.

If, though, he thinks that thereafter he can be reckless with his supper because he can escape the consequences by taking soda he will have done himself harm when he took the first dose.

It is doubly essential that the old should go to bed with empty stomach after a simple meal and properly poised mentally.

Exercise.—The old must get some exercise each day. If it is at all possible, the exercise should be taken out of doors. Morning is the time for exercise.

At Battle Creek it was noticed recently that a large portion of the people in the gymnasium were elderly. An onlooker laughed derisively. As a matter of fact the elderly persons taking exercise were wise.

Children can be left to get their exercise from play. Middle-aged people must exercise to keep themselves supple. Otherwise their joints stiffen and creak. The wisest of them recognize the absolute need of keeping themselves fit.

Old people need a daily "suppling" stunt just as much as do middle-aged people. They do not need to do so much; but they need to take some exercise each day.

Clothes.—Old people are poor heatmakers. Their blood vessels do not carry so much or change size so readily as do those in the young. The blood vessels of the skin in the feet and hands commonly do not carry enough blood to keep the extremities warm on a decidedly cold day unless they are warmly covered.

Old people should wear woolen underwear, woolen stockings and woolen gloves in cold weather. The old heavy red flannel underwear has no advantages in warding off rheumatism but is a good heat-saver.

A cold skin saves heat but it is uncomfortable; and there is no reason why an elderly person should suffer the discomfort.

The night clothes should be of wool or flannel. The old-fashioned night cap was a good institution.

Bathing.—Old people should bathe for cleanliness. They have no business using cold baths for stimulation or hot baths for sedatives. The old man who has "broken the ice each morning to take his plunge" should discontinue it. There is no reason for continuing it just to show his hardihood.

Turkish baths are not justified under any circumstances. The violent sweating is too hard on his skin. One compound cathartic pill will cause him to eliminate more waste than he could sweat out in a year's Turkish bathing.

On the other hand the heat and general strain is liable to stop his heart or break one of his fragile blood vessels.

Care of the Skin.—The fat is apt to disappear from the deeper layers of skin in old people. At the same time the skin loses some of its elasticity. The fat disappears also from the tissues beneath the skin. Besides the changes in the tissues from the disappearance of fat the organs actually shrink somewhat. This is the reason for wrinkles.

The skin of old people dries out. The dead layer thickens. There is a great tendency to the growth of warts and other kinds of thickened areas. These occasionally crack and bleed. The old need massage. They need massage for the muscles. They need skin massage.

Their skin will be better off if some form of grease is rubbed into them twice a day. A good ointment for the purpose is cold cream mixed with five per cent boric acid.

On account of the tendency of the skin to tan and crack old people will do well to keep out of dry living-rooms and offices.

Diet.—The old must be careful against overeating. Their teeth are usually poor.

If they do the necessary chewing they should be twice as long eating as in their younger years. Eating slowly makes light eating.

However, occasionally an older person gormandizes. Now elderly people require less food than young people. Von Noorden says that between sixty and seventy the amount of food should be reduced 10 per cent; between seventy and eighty the reduction should be 20 per cent; over eighty, 30 per cent. This is on the basis of a good deal of exercise taken. When the old person settles down to a quiet, inactive life he should eat a great deal less.

Saundby gives the following as a fair diet for a person of seventy, weighing 130 pounds and not notably active:

BREAKFAST

	Ounces		Ounces
Milk	8	Bread	2
Sugar	2/3	Butter	1/6

DINNER

	Ounces		
Bread	3	Vegetables and fruit	2 ounces
Meat or fish	2	Beer	½ pint

SUPPER

	Ounces		Ounces
Bread	3	Light pudding	4
Eggs	2	Whisky	2½

If a person has been accustomed to beer and whisky with his meals, he should be allowed to continue them when he gets to be old. At the same time I do not think much of the man who allows himself to develop the habit of whisky with his meals.

Generally speaking, no efforts should be made to change the habits of old people. This is true of tea and coffee, of tobacco, of habits of sleeping, of room ventilation, of habits of every sort. It holds true also of work habits. It is a bad plan for an old man to discontinue the work that has come to be a habit to him.

When old people are allowed to do things in their own way and at their own speed they can do a lot without fatigue. In fact, they fatigue less than younger people under the circumstances noted above. The reason is that they worry and fret less. With them there is less lost motion.

It is another case of the fretful colt hitched with the seasoned work horse. The former comes in at night hot, wet and tired; the latter cool, quiet and not overfatigued. This only holds true where the old man is allowed to do his task in his own way and at his own speed.

Returning to the question of diet—Saundby advises the free use of soured milks by old people. The easiest secured of these is buttermilk. In winter time the old person may need a good deal of heat, in which event he can take a buttermilk made out of whole milk with a culture. In warm weather ordinary skim milk buttermilk is better. Cottage cheese, clabber, whey kumiss, and kefir are easily secured.

Saundby uses sour milk made after the following plan: Hand skimmed milk is sterilized or thoroughly pasteurized to kill all the disease germs and also all those of the ordinary barnyard kind. The milk is then heated to 100° and put in a thermos bottle. Half a dozen yogurt tablets are crushed and added to the warm milk. The mixture is then put aside for twenty-four hours. The soured milk is sweetened and eaten.

Old people are apt to be troubled with constipation. A part of this is due to errors in diet; but the greater part is due to change in the walls of the large intestine.

In the first place, the walls lose some part of their sensitiveness and therefore do not keep the intestinal content on the move as is normal. In the second place, the muscle of the intestinal wall becomes flabby like the general muscular system.

I have known of old people becoming so constipated that when the largely

dilated lower bowel was finally emptied it was found that the accumulation amounted to many gallons.

Perhaps the accumulation had been gathering for years, a little each day. At times during this period the bowels had been constipated; at other times they had been normal; at still other times there had been diarrhea.

After a while the old person became sick with a low fever, then had some delirium. The doctor had been sent for.

In his examination he felt a large peculiar tumor in the abdomen. He diagnosed this as an accumulation of feces. When oil and enemas had produced the desired result the fever disappeared and all the symptoms passed away.

For constipation in the old soured milk is excellent. A pint of the yogurt milk described above may be taken each day. In making yogurt for daily use some of the soured milk of today may be used to sour the milk for tomorrow. It is not necessary to use tablets each day.

SOME PLANS FOR A LONG LIFE

In the sixteenth century Cornaro wrote a book entitled "How to Regain Health and Live a Hundred Years." As he wrote the third edition of his book in his ninety-fifth year and lived to be over a hundred his advice is worth listening to.

He lived abstemiously and carefully avoided all extremes of heat and cold, all extraordinary fatigue, all interruptions in his usual hours of rest and all bad air. He avoided melancholy, hatred and other evil passions. He laid especial stress upon eating a small quantity of food. At eighty he ate four meals a day. His diet list included bread panada, yolk of eggs, soup, kid mutton, poultry and fish.

Hippocrates advised good air, baths, friction and physical exercises.

Milton makes the Archangel Michael say of the way to reach old age:

> "The rule of not too much by temperance taught
> In what thou eatest and drinkest."

Lord Strathcona at ninety-two ate two meals a day, ate little or no meat, took a great deal of exercise, slept six hours and did not smoke.

Frederick Harrison at eighty-one gave golden rules of health:

1. To abstain from tobacco, spirits, made dishes and all such terrible things.
2. Rise from a meal with an appetite.
3. Walk every day for two hours.
4. Sleep eight hours.
5. Be content with what you have.

Tolstoi taught that the secret of long life is in fresh air day and night, daily exercise, moderation in eating and drinking, a hot bath a week and a cold one every day.

Von Moltke at ninety said he maintained his health by great moderation in all things and by regular outdoor exercise in all weathers.

The Prussian historian, von Ranke, rose at eight, took a cup of tea, worked until one, took a long walk in the park, ate a full afternoon dinner of plain food including two glasses of wine, worked until seven, took tea with his family worked or talked with his family until eleven and then went to bed.

Sir Herman Ueber, when over eighty, lectured to the Royal College of Surgeons on the means for the prolongation of life. He took a daily walk in all weathers, went walking for four hours once a week, and once a year he went on a walking holiday. He recommended mental occupation, gardening, intellectual games and traveling.

He spent his winters on the Riviera. He took breathing exercises for five to fifteen minutes each day. He slept six to seven hours and then arose to a bath followed by friction of the skin. He especially advocated regular bowel habits and simple, plain food.

He used no alcohol, stimulants, narcotics or soothing drugs. He advised the cultivation of mental tranquillity and hopefulness, the avoidance of grief and the control of the passions.

Goethe, after a youth of poor health, lived to be more than eighty. In his old age he became an optimist. This helped him to live on in spite of enormous portions of roast goose and bottles of red wine. He died of pneumonia. Metchnikoff said of Goethe in his last illness:

"If he had not been a drinker of wine, he would have been able to withstand this attack and to live still longer."

The germs that produce acid live on sugar. The food sugars commonly absorb out of the intestines within fifteen feet of the stomach. The fight against the germs which produce indols and phenols does not begin until the food has traveled thirty feet down the intestine from the stomach.

How to keep the sugars in the intestine for the lactic bacilli to feed on in order to fight each other was the question. Metchnikoff concluded that it could not be done, so he set himself to find a way to make sugar for the germ to feed on.

He found some germs which could do that. He now recommended that this germ be combined with the lactic acid producer: one to make sugar in the intestines and the other to eat the sugar and make acid.

However, Metchnikoff said he was sure the method was not yet complete and many changes would have to be made before the Methuselah type of man was made universal.

That does not spell defeat, however. The automobile today is quite different from the monstrosity that caused Ford's arrest in Detroit a quarter of a century ago. Yet Ford going down the street that day was starting something. The locomotive engine had to be shifted around a good deal to travel from the Stephenson type to that of 1916.

CHAPTER LI

Cancer

Many are the theories as to the cause of cancer. The disease is so palpable, so easily seen, and in its early behavior so different from the normal that men assumed there must be a definite cause in the early stages of science and, with a starting point established, speculation ran riot.

The disease was caused by eating meat and a case in some meat eater was the proof. Then somebody bowled out that explanation by citing cancers in vegetarian men and animals. The disease was due to eating tomatoes, or cabbage, or some other vegetable. Then came the days of bacteriology and its multitude of diseases with bacterial causes and surely cancer must belong in the list.

As a natural corollary there arose the group of speculators who said: "Since yellow fever has its stegomyia, malaria its anopheles, plague its flea, and typhus its louse, cancer must have its host transmitter." And wasps, earthworms, and itch mites have been accused.

In the meanwhile a group of microscopists was plugging away and from them has come the evolution of a theory which is illuminating and through which some material and practical advance may be made.

The theory of Ribbert is that cancer cells are anarchists; that the cancer state is a state of anarchy, and that cancer is anarchism.

Every cell in the body is an individual, lives its life and does its work as an individual; but that work is thoroughly adjusted to the work of every other cell. The human body is the community of cells. The laws of physiology are the laws of the commune.

Normally each cell stays in its appointed place, lives out its life, does its work, divides into new cells—each act being in relation to the need. Sometimes a cell will get away from its proper place, will get into a wrong area, will get away from its proper work, and will multiply and make new cells.

To show how fast the cells multiply and grow Bashford says that you could start with a cancer in a mouse and keep inoculating it, doing everything possible to promote growth, and in three years all the tumor derived from the small beginning in the mouse massed together would make a giant mouse as large as a St. Bernard dog.

Ehrlich inoculated a mouse weighing one-half an ounce with cancer. In a week the cancer weighed thirty grams, in three weeks forty-five grams, and in two months the tumor weighed as much as the mouse.

The essential point is that the cancer cells do just what normal cells do but they do it out of relation to need. The individual cell does its individual stunt in its individual way but with entire forgetfulness of the general good, and, though having more individual liberty than it ever had

before, with fatal results to the community—and when the man dies the cancer dies. Could there be a better illustration of anarchy?

Many men have worked on the contributing causes of cancer. There is some proof that cancer is contagious. Husbands have developed cancers after nursing wives with cancer and vice versa. Seemingly a better proof of contagiousness is the easily proved inoculability of cancer.

Every well equipped research laboratory now has some cancer mice, and from time to time pieces of cancer from these are used to inoculate new mice. Every domestic animal is subject to cancer and not infrequently research students succeed in inoculating domestic animals of various sorts with cancers derived from other animals.

Biologists say that this does not prove that cancer is due to a microbe but that the explanation is easy on other lines.

Cancer houses, cancer streets and cancer towns are recognized. There are damp walled, illy sunned and badly ventilated houses in which cancer seems to thrive.

Burnett's "The Campaign Against Microbes" recites pages of illustrations of cancer houses, cancer streets, cancer towns and cancer districts. His theory ties it up with thick, impervious soils, bad town drainage, marshes, and absence of sewers, bad house drainage, damp walls, wet floors, dark cellar sleeping rooms and poor ventilation.

Some cities make cancer reportable and have cancer spot maps just as they have scarlet fever spot maps. A Prussian sanitary ordinance passed in 1797 required that cancer be reported like other contagion. The proof seems conclusive that these are contributing factors of importance in cancer though there is no evidence that they act through microbes.

Ten years ago a Chicago physician—Dr. Stofer—proved that blastomycosis, a disease closely akin to cancer, was due to a microbe which grew on moldy, wet bedroom walls but nobody has gotten any closer to cancer in the intervening time.

There are those who think cancer is inherited. They do not think the disease is inherited but that a weakness toward it is.

They are right. There are cancer families. As Davenport shows, if we can compare the causes of death of people between forty-five and sixty-five in certain families with the same data for others we find great variance among them.

Of those dying during that period one-tenth should die from cancer according to the law of averages. If a family has a larger proportion of cancer deaths than ten per cent then that is a cancer family. But this, too, is only a contributing factor.

However, if the body is a commune and individualism is subjected to socialism there must be some machinery of regulation. What is it? There is an automatic something which automatically terminates pregnancy at nine months. The proof seems quite good that the something is the development of chemicals similar to antitoxins or, maybe, vaccines.

This is about the most striking illustration that I could give. There are scores of others going on inside the body incident to everyday life activities, some of which are somewhat worked out and others of which are pretty well thought out. Some of the men who are trying to cure cancer

CANCER A CURABLE DISEASE

The hope of curing cancer lies in early recognition and prompt surgical treatment

SURGERY IS SUCCESSFUL

IN	Percentage of Cures	
	Early Operation	Delayed Operation
Cancer of the Breast	80%	25%
Cancer of the Lip	95%	60%
Cancer of the Tongue	80%	15%

Approximate estimates furnished by the American Society for the Control of Cancer

Cancer causes 80000 deaths every year in the United States.

At ages over 40 one death in eight among women and one in fourteen among men is due to Cancer.

Yet cancer is not a hopeless incurable disease and very many of these deaths are unnecessary and preventable.

Cancer is at first a local disease beginning in a tiny spot.

At that time it can be easily removed by the surgeon and a cure is almost certain.

If neglected, it grows and is carried to other parts of the body and rapidly gets beyond control.

New York State Board of Health.

FIG. 400.

are working along this line and what they are getting looks like pay dirt.

The serum from animals cured of cancer will cure cancer in other animals. No way to make it work in men has been found. On account of a biologic resemblance between the young tissues of a fetus and the young cells of a cancer the tissues of still births are being used for the purpose of developing a vaccine. Pleuritic fluid, extracts of organs, various agents of this type are being used by men trying to cure cancer.

Some of the reports of cases treated in this way are promising. Analysis of cancer has shown that the cells are rich in glycogen. Glycogen is the form in which sugar is handed out to tissues. Its presence in quantity in tissue is a sign that that tissue is working hard.

Other men have found that when Roentgen rays were turned on tissues they pick out those rich in glycogen and shrivel them up while those poor in glycogen are not touched.

At once the idea grew that X-rays would cure cancer. It does cure some cancers pretty well but not all. In the first place, X-rays cannot penetrate well and therefore they are good for skin cancers but not of much account for deeper ones. Another limitation is that the rays are not selective enough. They pick out cells rich in glycogen and all young working cells are rich in glycogen. Therefore they get some good ones along with the bad ones. All in all we need some agent which can pick out cancer cells better than can X-rays.

The old arsenic and zinc paste cures were alleged to pick out the cancer tissue and leave the other behind. The ads had pictures of the roots which we were told were the roots of the cancer.

Unfortunately for the business of certain gentlemen it was easy to show that cancer has no roots and that what is left behind by plaster was seen under the microscope to have plenty of cancer tissue. What came away and was called roots was nothing more than strings of gristle.

Drs. Loeb, McClung and Sweek of St. Louis tell us their partial successes by injecting colloidal copper into the blood. Professor Leo Loeb is a brother of Professor Jacques Loeb and a most careful, painstaking and courageous investigator himself. For twenty years he has been working to find a cancer cure.

Ten years ago he found that he could cure cancer in animals by injecting cyanide of potash. But the dose required to cure the cancer was little short of the dose required to kill the animal. You see he had to take another tack.

A dozen of the best men in Europe had been working on colloidal selenium and eosin as a cure, and recently a report of a case of cancer of the stomach treated by injections of selenium was made. In the meanwhile Loeb and his associates had been working on copper injections into the blood. They could cure cancer in animals—why not try it on men?

A few months ago their courage got to the sticking point. They got hold of some cases that had to die—they were hopeless. They had been operated on sometimes more than once; the disease had returned; further operation was impossible. It did not seem possible to make things worse. Why not try to make them better?

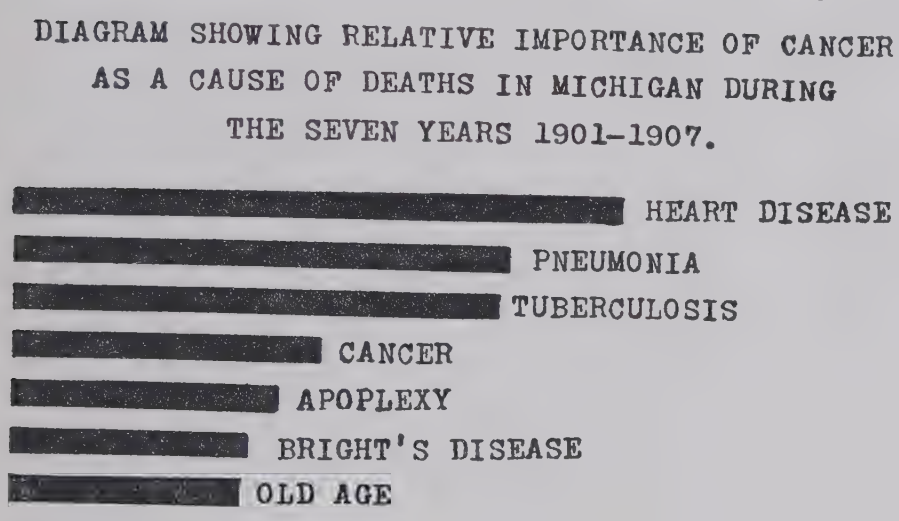
They began injecting these men, throwing into the vein from one-fifth

of a pint to a pint of watery solution of colloidal copper. Many of the symptoms improved under this treatment and the early reports are favorable enough to warrant the experimenters in advising that the method be still further tried out on cases where the diagnosis is certain and the cases are in a hospital where they can be watched properly; otherwise not.

It hardly seems likely that copper would be able to seek out the cancer cells to kill them off and leave the other cells alone. It probably has some such action. But is it superior in this capacity to X-rays or radium or the streptococcic serum?

The experimenters summed up as follows:

"We may state that we are now able to cause the gradual retrogression



Michigan Public Health. FIG 401.

of human cancer, and furthermore that the treatment does not seem to be limited to one kind of cancer, but is applicable in the effective treatment of various kinds of cancer. A definite judgment on the ultimate outcome must be suspended."

They also announce that they have arrived at two other conclusions. The first is that human cancer is more amenable to treatment than is mouse cancer.

As mouse cancer is being cured right along this opinion is fraught with hope. If the opinion be correct the little faults of procedure in curing human cancer should not delay discovery of cure for long but of course experimentation with men cannot go so far as experimentation with mice.

The second opinion is that there is no essential difference between mouse cancer and human cancer. Scientists have been agreed for some time that there was not a great fundamental and necessary difference between cancers and sarcomas—epitheliomas, carcinomas and sarcomas.

A long time ago the elder Krebs described a kind of tumor as a sarco-carcinoma because he could not say to which group it belonged. The little pigmented moles that develop into violent cancers in man and on the tails

of gray horses into fatal sarcomas have always been a battleground between the carcinoma and the sarcoma school.

Leo Loeb held views as to the cancers in the deeper layers of the skin which were much contended over. Some of the tumors in dogs and other lower animals were held by some microscopists to be sarcomas and by others to be carcinomas.

The meaning of all these contentions was that the differences between the varieties were superficial and changeable. For instance, Ehrlich inoculated an animal with carcinoma. He took the carcinoma from this second animal and inoculated a third. He kept this up for ten generations, when the growth began to change to a sarcoma; by the fourteenth generation it was a straight sarcoma. Burnett quotes Loeb as doing the same experiment with the same result.

From another standpoint, it does not matter so much. For instance, an epithelioma on the face is so mild as scarcely to be malignant at all but an epithelioma on the womb is exceedingly malignant. A carcinoma in the womb is mildly malignant; in the stomach it is violently malignant.

From certain curative standpoints there was a difference. For instance, Coley's toxin was much more powerful as a remedy against sarcoma than against carcinoma. X-rays did better with superficial epitheliomas than with sarcomas.

In the light of all this the hope of Drs. Loeb, McClung and Sweek that colloidal copper will be as useful against sarcoma as against carcinoma (and vice versa) has some foundation in the kinship of the tumors and makes unnecessary refinements in diagnosis on which some insistence is now put.

IMPORTANCE OF CANCER KNOWLEDGE

Lombroso held that criminals were marked by certain features which he called "stigmata of degeneracy." His view was that an expert could pick out criminals without any knowledge of the history of the men indicated.

When I first began examining specimens of tissue microscopically for cancer the average doctor thought cancer cells could be picked out as Lombroso picked criminals. For that matter it has not been long since it was the custom for an ailing man to walk up to a physician, poke out his tongue and say: "Doc, what's the matter?" If the physician began to ask for a history the sick man would take in his tongue long enough to say: "I came to get, not to give, information" whereupon he would stick out his tongue again.

The physicians now know that there is no such thing as a cancer cell and that as far as cancer roots are concerned nobody now believes in that fake except the worst of the fakers such as Chamlee and that the only way he can make it go is to follow the plan of the evil resort—split the money with the cabby.

Lombroso was wrong. The idea that there is a cancer cell is wrong. *A cancer cell is an ordinary cell in the wrong place and doing the wrong thing—that is all.*

Yellow fever has disappeared from this country. So has cholera.

Malaria is going. Twenty years from now all portions of the United States will be free from this disease. Hookworm is in the way of being banished. Consumption is on the run. Cancer and pneumonia are the next two problems.

The way must be found. The way to find the way is to turn on the light.

Hoffmann says that the number of deaths from cancer in the United States in 1913 was 75,000. Of this number, 30,000 were from cancer of the stomach and liver; 12,000 from cancer of the uterus and other organs of generation of the female; 10,000 from cancer of the peritoneum, intestines, and rectum; 7,000 from cancer of the breast and the remainder from cancer among the other organs.

The cancer death rate in 1912 in New York State was 86 per 100,000 living; in Greater New York, 80.9. The average rates for the last five years were: for Greater New York, 77; London, 94; Paris, 109; Berlin, 107; Chicago, 78; Philadelphia, 86; Boston, 107.

The rate for the old city of New York has increased in fifty years from 24 to 86. The principal increase has been in people over fifty-five years of age. There has been an increase in the cancer of every organ but one—the skin. Cancer of the skin has decreased. Note that fact, for presently it will be referred to and used as the foundation for the one big point in this article.

There is no reason for pessimism over these figures. Fifty years ago most of the people were dying far below the cancer age. The average age of death was far below forty-five to sixty-five—the cancer age. Again, fifty years ago microscopes were not in common use; everything was a guess and the records were not well kept.

Rittenhouse tells us in "The Human Factor" that between 1880 and 1910 the cancer rate in Massachusetts and New Jersey rose from 42 to 85. The statistics of Massachusetts and New Jersey were fairly well kept as long ago as 1880.

In ten registration states the increase in cancer between 1901 and 1911 at the different age periods was as follows: Twenty to twenty-four years of age, increase, 23 per cent; twenty-five to thirty-four years of age, increase, 4 per cent; thirty-five to forty-four, 1 per cent; forty-five to fifty-four, 14 per cent; fifty-five to sixty-four, 31 per cent; sixty-five to seventy-four, 35 per cent; seventy-five and over, 45 per cent.

The impression is general that the reason for the increase in the deaths of people past fifty is because more people live beyond fifty than in olden times. That is a part of the reason and a large part but for years Rittenhouse has been contending that it was not the whole reason.

To prove his point he has been using the statistics of New Jersey and Massachusetts, states whose figures of thirty years ago are fairly dependable. Rittenhouse proves that old people are having a harder time and showing higher death rates than a generation ago. One of the important factors is the increase in the deaths from cancer.

The second reason for writing about cancer is that a better way of diagnosing it must be found. The microscope has told us everything that it can about cancer. What it has told is not enough.

The biological chemists are now trying their hands. The old chemical

methods failed. The methods now being tried are the much more delicate methods of biological chemistry.

It may be that they, too, will fail but they have demonstrated enough to show that they are entitled to a trial. Institutions in which such trial is being made must have support.

However, the part of the diagnosing end now chiefly at fault is the postponement of the effort at diagnosing until it is too late for our ineffective methods to be of any service. The surgical method of treating cancer, while the best we now have, is a poor one. In time it will give way to a better method.

Most of the cancers are not diagnosed until surgery cannot cure. Dr. William Mayo says the largest number of patients with cancer of the stomach tell their physician of symptoms from which they have suffered from one to three years.

In 1890 Dr. Agnew of Philadelphia, then a distinguished surgeon in the evening of his life, said that he had never cured a patient of cancer of the breast by operation. He had operated on thousands. Dr. Agnew never operated until the signs of cancer of the breast were fully developed.

A few weeks ago Dr. Bloodgood examined a patient operated on by Dr. Halsted in 1890. The cancer had not come back. The statistics show that five years after operation, 47 per cent of the patients operated on at Johns Hopkins for cancer of the breast have had no recurrence.

Those are not exceedingly good figures. They are less than half as good as they should be. Some day a method will be found more than twice as good. However, they are much better than Agnew's—47 per cent of cures as compared with nothing.

The difference between the Agnew and the Halsted methods is that Halsted operates on suspicion: Agnew required "the signs of cancer to be fully developed."

In the Halsted method the tumor is removed, frozen, and examined microscopically, and what the microscope shows determines whether the operation is limited to the removal of the knot or made to include much beside. Furthermore, the microscopic sections of the tumor are made a part of the permanent record of the case.

As to cancers in general, Bloodgood tells us that in Johns Hopkins, where they have operated on suspicion 80 per cent of the cases have had no return of the cancer five years after the operation. Where the diagnosis of cancer was certain—from the looks of it and the way it acted—25 per cent of the cases have had no recurrence five years after. The one method cures eight out of ten, and the other, one out of four.

To stop the scoffers let me repeat that every growth is examined microscopically during the operation, or before, or after, and, if the microscope does not show cancer, it does not get into the list. No non-cancer cases enter into the statistics.

Hoffman tells us that in the last five years there has been a slight decrease in the deaths from cancer of the skin. The reason runs to the main point of this story. The skin is right before our eyes. We are constantly examining it. If a blotch the size of a pinhead appears it attracts attention.

Information about things is getting general. When we notice some ulcer,

knot, or growth on the skin, we give it care. The care is often foolish care. Often we do the wrong thing. We do not do the wrong thing so often as we did. The proof? The falling rate from skin cancer.

If the stomach could be put upon the surface cancer would diminish there. As that cannot be two things must happen—the people must know more about their bodies, must get accurate information in place of the foolish ideas, fears, and forebodings that now prevail; and the diagnosticians must improve their methods.

Cancer is not a blood disease. It is not always a local disease. In the later stages of certain cancers the cancer cells get into the blood but they do not stay there. In less than a minute they are thrown out of the blood and into some tissue, forming there a new growth called a metastasis.

In certain other cancers the cells try to get into the blood but they fail. They get into the lymph but the lymph glands filter them out before they reach the blood.

Cancer is not a blood disease nor even a disease present in the blood. At the beginning it is local and at that limited to a space too small to see. For a long time it grows only where it started.

Operated on at that time it is cured. As we have already said, at that time the surgeon has suspicions; he cannot be certain. If he waits to be certain the case is extremely apt to get beyond the range of cure.

Bloodgood tells us that in the state patients reach physicians from 25 to 50 per cent of them have passed into the hopeless stage. Many of these will live longer without operation than with it.

It is plain that we must have the cases come into view earlier than they now do. It is plain that the people must know more about these earlier stages than they now do.

In time a better method of treating cancer will be found. Many are being tried. The copper salts may yet offer something. For sarcomas Coley proposed an injection of streptococcus. At first they dared to inject more virulent material and they got some results. Later they seemed afraid of the pain, fever, and generalized infections and injected less virulent material, which fell short of expectations.

The *New York Medical Journal* has great faith in radium. In reporting the meeting of the College of Surgeons in Philadelphia lately [they] say had it not been that the speakers were men of the type of Howard Kelly and Robert Abbe, the positiveness with which they urged that radium would cure cancer when it could be placed in contact with it would have inspired skepticism. Fortunately the results obtained by them are in keeping with those of others, notably Louis Wickham of Paris.

The men taking part in the discussion were of the opinion that surgical removal should be done whenever it was possible. Radium should not be used just to stave off surgery.

Then, to summarize, the light must be turned on cancer because:

1. The disease is of great importance.

2. Our diagnosis is faulty, partly because the scientists do not know enough and largely because the people do not know enough.

3. Our cures are faulty, partly because our scientists do not know enough, and largely because the people do not know enough.

CANCER KNOWLEDGE NECESSARY

The New England states have been trying to discover whether cancer is more prevalent with them than elsewhere in the country.

The Census Bureau reports that in 1913 the death rate from cancer in the registration area was 78.9 per 100,000. The rate in Connecticut is 85.1; Rhode Island, 93.3; Massachusetts, 101.4; New Hampshire, 104.4; Maine, 107.5; Vermont, 111.7.

Why talk about cancer? For one reason, the people want to know about it. They know that it is a menace and that it is getting to be more so year by year. For another reason, we have something to say. It is not necessary to paint a grewsome story and stop. The way out is unfolding.

Miss Slye has told us that a person whose family are very subject to cancer can mate with a person not of a cancer stock and be certain that his children will not be in much danger from cancer. In three generations the susceptibility to the disease will be negligible.

For another thing, protection of the different organs of the body from prolonged nagging irritations will prevent cancer even in those of cancer stock. The intelligent person, alert in the care of his body and understanding something of his machine, can discover cancer or cause it to be discovered in him at a stage so early that cure is possible.

CANCER OF THE BREAST

Cancer of the breast starts with a lump in the breast. Not all lumps in the breast are cancerous. In the first place the normal breast has a lumpy feel. A tumor, however, feels harder and better walled around than does a lobe of the breast.

The most frequent tumor of the breast is fibroma. Fibroma is a hard, fibrous tissue tumor. It is as harmless as a wart or a wen or nearly so. Cysts of the breast are also frequently found. They, too, are harmless.

Caking of the breast results from infection with pus cocci. The infection travels from the skin up the milk tubes. The dairyman calls it garget. Caking of the breast grows rapidly, develops quickly, and hurts from the start.

At the other end of the line are fibromas and cysts which develop slowly, grow at a snail's pace, and usually give no pain. Occasionally some rub causes a tumor of this type to get a little sore, but the soreness is slight.

In between comes cancer. Pain is given as one of the earliest signs of cancer. The pain is sharp and shooting. It is due to the destruction of other tissues (microscopic, however, in extent) by the cancer cells.

Often this symptom is the first to direct the attention to the breast. A woman having such a pain feels for the hurting point, and her fingers make out a small hard lump.

If there is no lump the pain is probably a neuralgia but she had better feel carefully before concluding that there is no lump.

Later the cancer grows from the milk gland into the skin. The skin no

longer slides over the tumor. Still later the nipple retracts. Still later the glands in the armpit enlarge.

Now, what is good judgment? To wait until the glands enlarge or the nipple retracts is not good judgment. To wait a few weeks, say four or maybe eight, after the growth is noticed or the first pain is felt may be good judgment if the person watching the growth will do so in earnest. A judgment is to be formed on the rate of growth and the amount of pain.

To wait until one is sure the growth is a cancer is not good judgment. *Statistics show that operations based on shrewd guesses when these guesses are based on moderately extensive watching are good judgment.* After the skin is cut and the tumor can be felt and seen by the operator he can form a much better opinion about it. He can even cut off a small piece and have it under the microscope in fifteen minutes.

If he finds the growth to be a fibroma or a cyst he will remove it through a small incision leaving little scarring. If he finds it to be a cancer he should remove not only what he can see to be the growth but also all of the tissues into which experience has taught that cancer of the breast promptly spreads.

To remove what he can be certain is cancerous is not enough. He must guess how far the cells have spread and remove accordingly.

Proceeding on this plan nearly half the breast cancers are cured; by using plasters death results.

CANCER OF THE FACE

The mildest of cancers are those on the face. Some of them get well without treatment, some with pastes, some with X-rays, some with operations. *As cancers are generally thought to be incurable (most of them are when they are diagnosed) and as cancers of the face are so frequently cured they constitute the stand-by of cancer cures.*

A man will use a paste on a face cancer and the cancer will be cured; whereupon the man will believe he can cure any cancer anywhere on anybody. If he is a plausible rascal he may make a good deal of money before he is found out. Amongst his list of cancers of the breast and elsewhere that have not been cured will be enough cancers of the face and skin eruptions, improperly called cancers, to keep him afloat for a number of years. If he is an altruist and gives away his formula for a paste, accompanying it with a statement of cures, he will do but a limited amount of harm.

It is the advertisement that makes the harm of cures possible. Unless a good deal of money is spent on printer's ink cures do not spread. Even those that have merit are but slightly contagious and unless at least 50 per cent of the receipts go into advertising, there are but few takes.

Cancer of the lip is nearly always on the lower lip, the proportion being 20 to 1. Cancer of the lower lip is seven times as frequent in men as in women. It is not often found on the upper lip, but the few cases found are equally distributed between the sexes.

Why men have lip cancer more frequently than women is just a guess, but the guess is that it is because men smoke. Women also smoke at times but—there's the difference. Women smoke at times—some men smoke all

the time. It is just those smokers who constantly irritate their lips with a pipe or cigar that get lip cancers.

The surface of a lip cancer soon breaks and makes an ulcer. Around this ulcer is a hard area. When a man gets a lip ulcer, how is he going to know it is a cancer? Pain will not tell him because any ulcer of the lip is painful. Hardness is a fairly good sign but several ulcers on the lip are hard. The glands under his chin will enlarge but that test is not of much service because it is what is known as a late sign. Cancer spreads along the lymph vessels to the lymph glands. The lymph glands that swell when the lips are long out of order are those in the neck below the chin.

In cancer of the lip some of the cancer cells are easily broken loose by the muscles of the lip, whereupon they are swept along the lymphatics to the lymph glands under the chin. Therefore enlargement comes early as those things go. Nevertheless enlargement of the lymph glands is a late sign. An alert physician should be able to make a diagnosis before the sign appears.

Up to now we have not named any very good signs and there is no sign by which a man who has an ulcer on his lip can judge finally. A more sensible question is: What should make a man suspicious?

CANCER OF THE MOUTH

Cancer in this location is rare in women of any age and men younger than forty-five. But a man past forty-five, especially if he is a smoker who lets an ulcerated tongue drift on, ought to have a guardian. The "Index of Differential Diagnosis" says: "Any ulcer of the tongue occurring in a middle aged man, and lasting for more than two or three weeks, should awaken suspicion."

Cancer of the tongue rapidly develops into the ulcerated form. Therefore, when cancer is in mind the feature to look for is an ulcer. But inflammations of any sort when located in the tongue are apt to become infected and cause ulcer.

In the list of ulcers are the aphthous stomatitis (bad mouth cankers) and dyspeptic. Ulcers of these types should not last two weeks. If they show any disposition to hold on a free purgative followed by two weeks of milk, cheese, bread and fruit will cause them to disappear.

The above types of ulcer are too acute and too painful for cancer. The dental ulcer is generally an acute ulcer. However, that is not a good sign to go by.

The ulcer is the result of injury from a sharp tooth or a decayed one. The way to tell about these ulcers is to have the dentist pull the tooth, fill it or polish it, as the need may be. The dental ulcers disappear when the offending tooth is made unoffending.

The hardest of all the tasks is to distinguish the syphilitic ulcer. Time was when mistakes on this point cost many lives and there was no remedy. Now a microscopic examination of the secretion of a venereal ulcer will show the germ. A Wassermann reaction will be positive and an injection of salvarsan will cure the ulcer in a week.

The ulcers of cancer are liable to be on any part of the tongue though

they are more frequent along the side. In addition to hurting and bleeding the cancer ulcer causes a hardness in the tissues around the ulcer.

There are several conditions that cause hard, boardlike areas to appear on the tongue. The name by which the doctors know these conditions is leukoplakia. Leukoplakia is not cancer. It is not an acute condition. The patches stay unchanged for years.

In time, however, cancer develops on leukoplakia patches. An ulcer develops in the midst of the boardlike tissue. If, then, a man has had one of these patches for some time and an ulcerated area develops on it he should seek counsel at once.

It does not pay to temporize with cancer of the tongue. The growth promptly spreads to the glands of the neck. A manana *policy means inoperable cancer.*

CANCER OF THE STOMACH

The most frequent cancer is that of the stomach and liver. The two are grouped because cancer of the liver is generally secondary to cancer elsewhere and the stomach is the most frequent location. That cancer of the liver is secondary is true even when the cancer of the liver is very large and the other cancer is small. The liver is not a good starting place for cancer but when it reaches there after starting elsewhere it finds growing conditions good.

The leaflet of the Chicago Medical Society on "Early Signs of Cancer" gives the following early signs of cancer of the stomach: "Indigestion, slight distress or pain in the stomach, and general weakness and loss of flesh."

Of all cancers our methods in cancer of the stomach are about the most unsatisfactory. This is true both of methods of cure and of diagnosis. When a tumor can be felt or a knot appears in the neck diagnosis is easier; but what is the use of knowing when nothing can be done?

"The Index of Diagnosis" gives the following suspicious signs: Indigestion beginning abruptly in a patient above the age of 40 and not yielding to diet or treatment—a mild gnawing pain coming several times a day. (This pain is much less severe than the sharp neuralgic pain of too much acid. It is less violent than the pain of ulcer.) Loss of appetite in a person of cancer age and without any good cause, especially a loss of appetite for meat; vomiting, not violent, but a little disposition that way nearly every day. (One case out of five will vomit a little blood.) A steady loss in weight, for which no cause can be found. Seven cases out of ten occur in persons between 40 and 60.

These are the suspicious signals. Any one who guesses that he has cancer because he has any one of these afflictions is not wise. Any person who has several of them and fails to have a careful examination made is not wise.

A careful physician after inquiring into the above points will start his examination. He will give test meals, empty the stomach of its contents and then analyze the material pumped up. He will carefully examine both the stomach contents and the bowel movements for occult blood—that is minute traces of blood. He will illuminate the stomach, fill it with bismuth and X-ray it, and probably will try some of the new biological tests for cancer

recently proposed by the German scientists and now being tried out in hospitals and laboratories the world over.

He will make an examination of the blood. Cancer of the stomach destroys blood cells all out of proportion to its general destructive work, just as it interferes with nutrition and causes a great loss of flesh even before it has reached any great size.

LAY DIAGNOSIS OF CANCER OF THE STOMACH

Is there any one sign by which a person can tell that he has cancer of the stomach in a stage in which anything of importance can be done? The answer is in the negative. Cancer causes a tumor. Unless the tumor is on the back portion of the stomach it can be felt through the abdominal wall. But that symptom is not worth much, since it means a late not an early stage.

Rapid loss of weight with stomach symptoms is a good sign, but it means late not early cancer. Vomiting of blood, anemia, and loss of appetite, especially for meat, are good signs, but they come too late to be of much service. Pain in the stomach is the best of this group of symptoms, but there are several other causes of pain.

Are there any feelings which should cause a person to suspect cancer of the stomach and, acting upon the suspicion, to have a careful examination made; I mean feelings which should put a man on guard when the disease is in its beginning? I think this question can be answered in the affirmative.

If a person past 30, man or woman, has a pain in the pit of the stomach for a week or two or has indigestion for that length of time he should eat very lightly for three or four days. He should eat one slice of bread or toast and one cup of coffee, tea, beef tea or warm water three times a day for that length of time. It is well to begin the period of fasting by taking a mild purge.

If the pain and discomfort, nausea, indigestion or vomiting continue after the stomach has had a chance to rest and recuperate (say if it continues beyond the first day) the person is justified in going to a skilled diagnostician for an examination of the stomach contents for blood, acid and other ingredients; of the feces for minute traces of blood; of a drop of blood for general traces of the disease; and for a physical and X-ray examination.

The examination to be of any value must be painstaking and thorough. Superficial examination will not "find" cancer at a stage when anything is gained from having the information.

Cancer of the stomach belongs to the cancers which spread slowly. The growth does not spread to the glands until it has been present for months. The seriousness of cancer is dependent upon the degree of spreading to the near-by glands. All of these considerations make us believe that operation on very early cancer of the stomach should give good results.

Smithies tells us that at the present time only one of seven people operated on for cancer of the stomach dies from the operation.

One great need is for some certain sign of early cancer of the stomach.

CANCER OF THE SKIN

Cancer is a local disease. At the beginning it is limited to one spot or location. After a while some of the cells are carried to new locations. It then is still a local disease but it is growing in more than one locality. In no proper sense is it ever a blood disease. Blood impurities, so-called, never have anything to do with cancer.

Cancer, then, being a local disease and a disease occupying in the early stages little space in a single locality the most important of all questions is how to know it.

When we came to know about consumption (by we I mean John, Henry, and Pat) we found that early diagnosis was the key to the situation. When we (meaning the general run of people) begin to know about cancer we shall find that early diagnosis is the key to the situation.

Then the question as to how to tell cancer in the early stages is a most important one. Some of the old ways of telling fail to interest us because they do not help. For instance, the odor of cancer is of no interest because the odor does not develop until the disease is far advanced. A better way of putting the question that interests the general run of people is: What should make one suspicious of cancer?

Let us try to answer the question for the more important organs.

The skin: The suspicious growths are those in which the symptoms are between the acute infections and the slow, harmless growths. Infection of the skin causes boils and bumps. These quickly become sore and give pain. In ten days or two weeks the soreness and pain have lessened or disappeared. Ordinary warts and gouty patches do not get sore, cause inflammation, or produce pain. The cancer conditions come in between. With them there is no soreness or pain for some weeks. Then the discomfort begins slowly and gradually increases. Generally speaking, small cancer nodules cannot be slid around with the skin as can warts and moles.

Generally speaking moles are much more suspicious than warts. Most skin growths, and especially warts, need to be trimmed off occasionally. They pile up scales, scabs and horny masses. These are hard, irritate, and cause some tenderness to develop. These need attention just as the nails and hair need to be trimmed.

The moles stay about the same size. If any mole gets sore or grows the matter should be investigated. The growth there is deeper in the tissues. A certain amount of attention to warts and such growths, what may be termed toilet of them, is proper. Moles should be left unmolested.

If an ulcer of the skin develops slowly and persists it is a cause for suspicion. It may be due to infection (tubercular, syphilitic or some other), but it is better to have someone pass on it.

The location has much to do with the case. If the knot or ulcer develops on the lip or at some other point where there is frequent irritation it is more suspicious than if it develops in other areas.

CANCER OF THE UTERUS

I am sure there are many right-thinking people who will be sorry to see this subject touched upon. While they think it all right for themselves they think there are other readers of this volume for whom this article will prove too plain spoken. If we can persuade each reader to settle the question for herself alone we shall make some headway.

On the other hand, a national organization composed of some of the ablest, most conscientious people in the country is quite convinced that, as a result of false modesty and a lack of plain speaking several thousand women annually lose their lives unnecessarily. It has, therefore, appointed a committee charged with the duty of public education on this necessary subject.

Cancer of the body of the uterus is one of the milder forms of cancer. When removed it is not expected to return. It is frequently found rather advanced at the time diagnosis is made. Nevertheless, operation is successful.

Cancer of the os, as it is termed, is one of the wildest and most malignant forms of cancer. It develops rapidly and after removal comes right back. In 60 per cent of cases it is back in six months. This unfavorable outlook is because the disease is not recognized until a late stage when it might just as well not be recognized at all.

A committee appointed by the Chicago Medical Society has issued a circular on cancer with a short statement on: (1) "How to Recognize Cancer," (2) "When Cancer Can Be Cured," (3) "How Cancer Can Be Cured," (4) "The Nature of Cancer."

"The chief symptoms of cancer," it says, "located anywhere, are a growth, pain, bleeding (when near the surface), weakness and loss of flesh.

"The earliest sign of cancer of the uterus, and the most important one, is marked by some irregularity in the monthly period.

"Cancer, in its early stages, is a local disease. It is at this time that it can be cured by a simple cutting operation. Cancer, if neglected and allowed to develop, will become an extensive disease, and then it cannot be cured by any method. Advanced cancer cannot be cured by surgery (the only real cure), hence the necessity of seeking surgical aid promptly."

SARCOMAS

Sarcoma is a kind of cancer. Scientists have been trying for a long time to divide sarcomas off from the cancers but they have never succeeded in making a distinction that was of practical importance. Every now and then a tumor run through a series of lower animals will change from one class to another. The main reason for trying to keep the class sarcoma to itself is because the sarcomas act so much more like infections than the carcinomas.

Half a century ago the changes in the lungs brought about by consumption were held to be due to cancer and men wrote about them as if they

were cancers. Then came the discovery of the tubercle bacillus whereupon tuberculosis was permanently taken out of the cancers.

Along about the same time the gumma was called a cancer. However, after we learned about venereal disease and mercury the gumma was taken out of the group of cancers. This happened a long time before the spirocheta was discovered.

Scientists keep looking for a germ for sarcoma and some day they will find one whereupon it will come out of the cancer list where it now is.

The large, massive cancers which do not ulcerate are usually sarcomas. Again, it is the sarcoma of young people as contrasted with ordinary cancer, the cancer of older people. It is the cancer which follows a single injury as compared with ordinary cancer which comes from long nagging injuries such as the cutting of the tongue by a ragged tooth, of the lip by a pipestem, of the breast by a corset steel. For instance, I have just seen a boy who was struck on the bone of the arm and shortly thereafter a swelling commenced and in time it was found that the swelling was a sarcoma of the bone.

All cancers grow rapidly (at least at times), tend to destroy the tissues around them, tend to come back after they are removed and tend to form metastases; that is, in them there is a tendency for some of the cells of the tumor to break away and be carried to other parts of the body and there to grow. In ordinary cancers these cells are carried to near-by lymph glands and cause these to swell. Until late in the disease the cancer sticks rather close by. In sarcoma the cells get into the blood and are carried everywhere. They are liable to locate anywhere in the body and there to stay and start new tumors.

How is one to know that a given tumor is a sarcoma?

If the growth is coming up like an inflammatory swelling but not fast enough for that, if it is not painful enough or hot enough or red enough for inflammation but still is coming one should be on his guard. If it is a pretty well defined tumor he had better let his physician pass on it. If the physician cannot form a judgment right away he is justified in watching it for a few weeks only. By that time, the mass growing meanwhile, he had better take out a piece the size of a good-sized pea and examine it microscopically.

TO WARD OFF CANCER

Let us say that a young man takes stock of his family strain. He finds that several relatives who have descended from his great-grandparents have had cancer. The percentage of those who died between 40 and 60 years of age who had cancer was large—let us say twenty-five. He is of a cancer family. Perhaps neither of his parents had cancer. That makes no difference.

The eugenists say that cancer is a recessive. Diseases of the recessive group such as cancer, albinism and bleeding often skip a generation. What shall he do? Choose a wife who does not belong to a cancer family. But you will say that he may protect his children and his grandchildren but not protect himself. What can he do to protect himself?

Miss Slye says: "Cancer is not transmitted as such, but rather as a

tendency to occur from a given provocation, probably in the form of overirritation. The elimination, as far as possible, of all forms of overirritation to the tissues of an individual of high cancer ancestry should go far to get rid of the provocation of cancer, and the eugenic control of matings, so that cancer shall at least not be potential in both sides, ought to eventuate in a considerable decrease in the frequency of human cancer."

Suppose a man has discovered that he belongs to a cancer family, is an "individual of high cancer ancestry." Specifically what should he do to be saved from his family tendency? He should give up smoking. It has been proved that smokers, and especially pipe smokers, are unusually subject to cancer of the lips and tongue. The harm results from irritation by the pipe-stem.

If he is an inhabitant of the Philippines he should give up the chewing of betel nuts. About the only Filipinos who have cancer are the betel nut chewers. They have cancer of the cheek.

He should have all ragged teeth removed or smoothed off. He should not wear a dental plate if it irritates. If he has any chronic sores anywhere on his body he should have them healed up. If his work irritates any part of his body he should change his occupation. For instance, in olden times there were a group of men who made their living by cleaning chimneys. In doing their work they sat straddling the top of the chimney, working their long-handled brooms. The position which they constantly occupied caused sores to come on the inside of the thighs. Most chimney sweeps died of chimney sweeps' cancer, cancer of the inside of the thighs.

A man with a cancer ancestry should not neglect any chronic stomach trouble which he may develop. Cancer of the stomach often grows out of unheeded dyspepsias and neglected ulcers of the stomach.

If a woman has the bad family history she must be extra careful with her breast glands. Corset steels must not be allowed to irritate nor must the clothing be irritating in any way whatsoever. The breasts at nursing and pregnancy periods must not be neglected. It is almost as important that there shall not be neglect of the generative organs. In the first place, venereal diseases must be avoided or having been contracted must be completely cured. Pelvic suppurations and discharges must not be allowed to continue indefinitely.

Risks that a person of another family strain can safely take the person of a cancer strain cannot. The latter must avoid all forms of chronic irritation.

CAN ANYTHING BE DONE TO CURE CANCER?

Not very much. If the disease is discovered early and operation is done promptly the chance of cure is fairly good. If the disease is advanced, operation, radium, and X-rays are of limited value. The only cancers cured by pastes are not cancers at all. Somebody has been mistaken, honestly or otherwise.

Can anything be done to prevent cancer? Yes. Cancer is to be classed as a preventable disease. As soon as the information can soak into the general public's mind, that fact is most important.

There are three phases to the cancer prevention question. In a certain sense cancer is an inheritable disease. Inheritance can be prevented.

Cancer results from long continued irritation of the tissues of a locality. This irritation can be prevented. Cancer develops most readily and grows most readily in overnourished people. Overnourishment can be controlled. Therefore, the statement that cancer can be prevented.

Now for the details of the first of these proposals. The statistical proof that cancer runs in families has been known for a long time. Of the people who die at the cancer age about one in ten dies of cancer. If, in a given family, the death rate from cancer among those dying at the cancer age is one in five or higher, we say that they belong to a cancer family. There are families in which the cancer rate among the people concerned is much more than one in five.

For several years Miss Slye of the University of Chicago has been patiently working out the proof that cancer runs in families. She has made thousands of observations. Mice have cancer. As mice multiply abundantly, breed when very young, and, in their breeding, can be completely controlled, she chose to study the family histories of mice rather than that of men.

She had one family of cancer mice under observation for twenty-five generations. As the result of these thousands of completely controlled experiments she is able to state certain conclusions with great positiveness. She says:

"Cancer follows the laws of heredity with an inevitableness which makes it a character which can be manipulated."

The inheritance law of cancer is exactly the same as that of albinism. There need be no albinos. The condition can be absolutely prevented.

Continuing, she says: "Cancer can be bred into or out of a strain at will. It can be put into a strain where it has never existed before. It can be bred out of a line one side of which originally carried 100 per cent of cancer."

She knows these statements to be true, because she took a strain of mice in which cancer had been inbred for twenty-five generations and in which all the members suffered from it, and she bred it out until the line was free from it. She took another strain in which there was no cancer, and by mating them with cancer strains bred cancer into the stock.

RADIUM, X-RAYS, AND ULTRA-VIOLET RAYS

There is reason to believe that X-rays, radium, and radio-active substances and ultra-violet rays can cure certain cases and certain kinds of cancer. There is reason to believe that they cannot cure or even benefit other cases or other kinds of cancer. The difficulty is for a man to decide which group his cancer is in. If he decides rightly, he will have a good chance to live. If he decides wrongly he will throw away his chances of living.

Cancer cells are young, actively growing cells. The chemists tell us they are rich in glycogen. Glycogen is the form in which sugar is put when it is to be used by the cells. As young, growing, dividing cells need a great deal of glycogen and older, resting cells need but little, analyses of cancers show a great abundance of glycogen.

When tissue is exposed to X-rays, radium, or the other agents, the cells rich in glycogen are destroyed much more rapidly than the other cells, provided the curative agent can get at the tumor cells. This proviso is the key to the limitation of these agents.

The skin is for the purpose of keeping things out. That is what it was built for. It will keep out sun rays, X-rays, ultra-violet rays, and radioactive substances.

If the cancer is on the surface and not covered by skin these agents are of service. If their rays must penetrate to reach the cancer, or any considerable part of it, or any secondary growth of it, they do no good.

They can cure cancer of the skin. Possibly they can cure cancer of the neck of the womb. And that is about all.

They cannot cure cancers of these tissues if the cancer has jumped (formed metastases, the doctors say) in the lymph glands.

Some of the cancers in these localities can be better cured, cured with less pain and more certainly cured by operation than by any one of the different forms of radiation. Just which cases are best suited for radiation and which for operation call for good judgment founded on knowledge and experience.

Internal cancers are not cured by these agents. There is no reason for thinking they can cure or even help cancer of the stomach, liver, or intestines. There is no reason for thinking they can cure cancer of the breast. Cancer in this locality does not break through the skin until the disease is far advanced. At such time it is certain to be in the muscles and also in the glands. Even if the cells under the ulcerated area were killed those tucked away in the muscles and glands would continue the growth.

They are of no service in cancer of the kidneys, peritoneum, bladder, or female generative organs above the neck of the womb. They are of no service in bone or muscle cancers.

They are of service in cancer of the lip. This mild form of cancer is cured by almost any "cancer cure."

They may be able to cure cancer of the tongue, and yet it is doubtful if they should be tried on cancer in this location. Cancer of the tongue spreads to the glands so promptly that one is not justified in trying time-consuming experiments on himself.

Probably Not Cancer.—*M. A. W. writes: "I have a cancerous growth on my face as large as a 25-cent piece. 1. What can I put on it to prevent it from increasing in size? 2. Is tea made from red clover blossoms injurious if taken frequently and in large quantities? I find it some help in retarding the growth on my face, not so much as is claimed for it, but there is more discharge and more rapid growth if I do not drink it."*

REPLY.—1. Nothing. The chance is good that the growth is not a cancer. Most so-called face cancers are not cancers. If it is a cancer, either keep it clean and do nothing or have it completely removed.

2. No.

Needless Cutting Deplored.—*A. V. V. writes: "Noting your answer to 'Adelaide,' regarding a lump in her breast, your advice being that she 'had better have a doctor see it and decide whether it is cancer,' I beg to know whether you hold that a superficial examination, even by the most ex-*

perienced physician, could absolutely determine whether a lump in a woman's breast was cancer? It has long been my understanding that not until such lump has been removed by the surgeon's knife and a microscopical examination thereof made can its nature be determined; therefore, it would seem best that any lump in a woman's breast should immediately be removed, and no chances taken that it may not prove to be of cancerous growth."

REPLY.—To remove every nodule in the breast as soon as it is noted, making the diagnosis after removal, would lessen the number of deaths from cancer if the women would come for examination. It also would sacrifice many breasts needlessly. If surgeons were to adopt that policy they would save themselves some mistakes but on the other hand, the women, knowing this to be the policy of surgeons, would be liable to keep away until they were pretty certain that the nodules were cancers. This would substitute the woman's opinion in place of the surgeon's. The character of the growth, the feel of it, the rate of growth, the location, the presence of pain, the age of the patient—judging by these a fairly reliable opinion can be formed. On the other hand, part removal stirs cancers to active growth. Cancers should either be removed wholly and with a good deal of surrounding tissue or they should not be cut at all.

Cancer of Stomach.—*Mrs. O. M. R. writes: "What are the symptoms of cancer of the stomach? Is there any cure?"*

REPLY.—What you want to know is what symptoms would make you suspect cancer of the stomach and cause you to investigate further. Of first importance is your age. The age of maximum liability is 45 to 60. In Welch's series of 2,038 cases 24.5 per cent were between 40 and 50, and 30.4 per cent between 50 and 60.

Next is family history. Do you belong to a cancer family?

Next is a history of ulcer of the stomach. In Rodman's series of cases, 14 per cent had had ulcer; in Klausa's series, 26 per cent.

Next is a history of dyspepsia. A prominent sign is a progressive decline of appetite. There may be a sense of oppression in the pit of the stomach after eating. There may be a little pain and occasionally there is vomiting. If there is vomiting there may be a little blood in the vomit. The skin begins to show pallor early. The weight begins to drop early. The strength and endurance fail inexplicably.

Anyone inquiring into his condition and history who can reasonably decide that these details apply in his case should have an examination. When tumor or vomiting or great wasting appears it is too late. The examiner will make an analysis of the stomach contents for acid, will examine the feces for blood, will make an Abderhalden test and will take an X-ray in addition to making a physical examination.

See Your Physician.—*B. S. writes: "I am a widow 28 years old. My left breast has little pains in it, and they seem to be moving all around it. I can't say they are sharp pains, but I feel somewhat uneasy about it, as I think there is something wrong, or these pains would not bother me at all. Do you think it could be a cancer coming? Sometimes when I raise my breast up it pains me to do so. About two years ago I went walnut hunting. Two walnuts, both on the same stem, fell on this left breast. It turned black in a few minutes and pained me badly at the time,*

There does not seem to be any swelling at all, no sores of any kind, and it looks all right. I had a nervous shock from my husband's death, and have been nervous since. My hands and head shake, and my nerves are sensitive. I have doctored for this trouble, but medicine relieved me only for a while. I can hardly sleep, my body jumps so, and the least thing scares me. This has been going on for nearly three years. During one bad spell I had my heart beat so rapidly in turning over in bed that I had to take heart medicine every fifteen minutes. Is there any cure for my trouble?"

REPLY.—1. Probably you are free from cancer. Have a physician examine your breast. If there is no nodule pay no attention to the little pains.

2. You should not take heart medicine every fifteen minutes unless you are being watched by your physician. Have your physician examine you. If you have no thyroid enlargement and no other organic trouble then proceed to get your nerves under control. This is not a medicine-taking proposition. Perhaps you will succeed best by going to a rest cure. Perhaps you can succeed by study of some book such as Courtney's "Control of Nerves."

Senseless Worry.—*Mrs. A. W. writes: "I am 56 years old and am extremely nervous. I recently saw an article which you wrote about cancer. I had a sore breast when my first child was born, twenty-eight years ago. I fear blood poisoning started to set in. I always feel a queer sensation in that breast. My doctor assures me it is the nerves. There are no lumps, but I am always worried, fearing I might get a cancer, as you say cancer can come from ulcers."*

REPLY.—As you say you have no lump in your breast you have no more cause for worry than any other woman. Because occasionally a woman is run over by a street car is that any reason why every woman should be afraid to cross the street or to worry about the dangers of street cars? Be level-headed, do your work, take proper care of yourself and let the future alone.

Cancer Cause Not Known.—*H. J. asks the following:*

"1. What is the cause of cancer?

"2. Can you in any case attribute the origin of a cancer to a previous injury?

"3. If you assign various causes of cancer for the different parts of the body, then please state what is the cause of a lady having cancer of the breast."

REPLY.—1. Causes are divided into main and contributing. The main cause of cancer is not known. There are two principal theories: (a) It is due to some organism—a bacillus, spirillum, yeast mold or some other low form of life. (b) It is due to perverted cell tendencies—the ordinary cells of the body get away from where they belong and lose all tendency to mature but instead multiply wildly. The food theories have not many followers. There are not many facts to support either of these theories.

2. Yes, injury is a contributing cause.

3. Among the contributing causes of cancer of the breast are injuries from blows, from corset irritation and from abscess.

Cancer.—*Mrs. B. R. writes: "In what length of time would an internal cancer develop?"*

Reply.—The question in this form cannot be answered. If you mean how soon after an ulcer shows itself will a cancer develop the question is nearly as difficult. The theory is that cancer develops from epithelial cells that have got out of their proper place. Sometimes cancer develops in a few weeks after such displacement. On the other hand, there is some proof that cells destined to develop into cancer can lie dormant for a long time.

Stomach Cancer Symptoms.—*M. L. S. writes: "Will you kindly advise me what the symptoms of cancer in the stomach are?"*

Reply.—Cancer of the stomach causes pain, vomiting and rapid loss of flesh. Examination of the stomach secretions shows blood present and acid absent. Sometimes the tumor can be felt. The blood may be black or red. There are chemical, bacteriological and X-ray bismuth tests that help.

Unfortunately there is no way of diagnosing cancer of the stomach that helps much. When the diagnosis can be made it is too late to operate.

Anyone of cancer age who has a persisting stomach pain and vomiting had better go promptly to a physician and have the diagnosis of cancer ruled out or confirmed.

Cancer Not Inherited.—*G. B. S. writes: "1. Is cancer ever inherited? 2. Is there any danger of contracting the disease by kissing a person suffering from an open cancer of the breast? 3. Is cancer communicable through the discharge from an open cancer sore?"*

Reply.—1. No. However, there are families in which the middle-aged members are more subject to cancer than the average.

2. No.

3. It is barely possible. The danger is slight.

No Good for Cancer.—*S. writes: "Dr. Trebes Ross of London advocates salts of potash as a help, and perhaps cure, for cancer. What is your opinion? Can any harm come from taking it?"*

Reply.—1. Will do no good.

2. Not much. Potash salts are slightly poisonous but not highly so.

X-Ray and Cancer.—*D. A. B. writes: "1. What success has the medical profession had in treating cancer with the X-ray? 2. Is it not a fact that the X-ray causes cancer and is positively dangerous for such uses? 3. Would the X-ray have any curative effect on stomach troubles, such as inflammation, gastritis, ulceration, or on a kinked bowel due to muscle displacement or pressure? 4. How are physicians who make such claims and secure patients by reason of such, looked upon in the medical profession?"*

Reply.—1. Very good success with skin cancer; poor success with cancers situated deep in the body.

2. Yes, X-ray causes cancer. If by the last half of the sentence you mean dangerous when used to cure cancer, the answer is no. The worst that can be said is that in cancers unsuited for its use some people have used it instead of having the growth removed.

3. No.

4. No reputable physician would claim to cure gastritis, ulceration of the stomach, or kink of the bowel with X-ray.

Fish and Cancer.—*Mrs. M. P. writes: "1. Do you consider a fish diet to be a cause, or contributing cause, of cancer? 2. Are fish known to be subject to any vicious growths that make them, when so affected, unfit for food? 3. If so, can their condition be detected in fresh caught fish?"*

Reply.—1. No. In speculations as to the cause of cancer fish, tomatoes, meat and various other foods have been accused. There is no reason to think food a factor of consequence in cancer.

2. Fish have cancer. Periodically, all kinds of animals have cancer.

3. Buy none but healthy looking fish. Buy no fish with a tumor. Cancer in a fish shows plainly. Nobody cares to eat a fish with cancer even though the chance of so contracting the disease is negligible.

Need of Cancer Knowledge.—*No Name writes: "For pity sake, do let up talking about cancers. You are making people morbid on the subject and we all are getting sick and tired hearing about cancer."*

Reply.—For years the advertising cancer fakers such as Chamlee and Byers have devoted a few hundred words every day in hundreds of newspapers to misinforming and misleading the public. Do you not think it fair to devote some space to telling the truth? Or let us look at it from another standpoint. Out of every 100,000 people in the United States seventy-five die each year from cancer. Cancer causes one-twentieth of all the deaths. The people who have the disease now in an incurable stage once had it in a curable stage. They let it pass beyond that stage because they did not know. About 100,000 such die in the United States each year. Do you not think you are selfish to wish information withheld from these merely because it disturbs your peace of mind? Do you not think that you and your group ought to be more patient, considerate; and especially more Christian? The very great majority of you are sane enough not to be harmed. A small minority are so ill balanced as to be harmed. Should we not try to do the greatest good to the greatest number? Be fairer with your unfortunate fellows.

Cancer of the Bladder.—*J. L. writes: "Why is it my urine has such a fetid odor? Could it be cancer of the bladder?"*

Reply.—Cancer sometimes affects the bladder. There is no cancer odor. Cancers become infected with the germs of putrefaction. The odor of a cancer depends upon which one of these happens to get into it. Therefore some cancers are odorless and others have odors of different kinds. Fetid odor in the urine probably is dependent upon the bacteria present. Your physician may be able to remedy the condition with antiseptics which are eliminated by the kidneys. Odors sometimes result from certain aromatics in the food—for example, asparagus.

Should Not Cause Cancer.—*J. S. T. writes: "I have remarked that without any other noticeable cause cancer occasionally follows closely after a severe case of poisoning by poison ivy. Poison ivy grows in such great abundance that it would seem as if it must have some use other than just to inflict punishment on hapless children, who so often fall victims to its evil effects. Has any experiment ever been made to test whether poison ivy would cure cancer?"*

REPLY.—I have been unable to find that poison ivy has been used to cure cancer. I do not think it would have any effect. Cancer frequently follows long continued inflammation and irritation. These influences are factors in causing it. An acute inflammation such as that caused by ivy should not be a factor.

Wait Three Weeks.—*German writes: "I am a married woman, 25 years old. For the last week I have noticed a tender spot on my left breast. There is no mark or bruise there, and I don't remember ever having hurt it. But it feels sore when touched, and there seems to be no swelling. 1. Do you think this may be a cancer? 2. Should I go to a doctor at once, or wait a while to see if it goes away? 3. Will you please describe symptoms of cancer of the breast? I have a good appetite and I am in good health otherwise. 4. Will the taking of a preventive medicine finally weaken the female organs or cause a tumor later on?"*

REPLY.—1. Yes, cancers cause pain when small—small enough to be overlooked. The chances are that you have not cancer.

2. I judge the pain is but slight. You are justified in waiting three weeks more.

3. Any tumor of the breast should be examined and then reëxamined at intervals if it is not operated on at once. Generally cancers grow more rapidly than other tumors. Pain, especially a sharp, shooting pain, is suggestive. Kernels come under the arms, the nipple retracts and sores form but these are late symptoms. The breast should never be left long enough for these three symptoms to develop.

4. No.

See a Surgeon at Once.—*Mrs. M. O. writes: "About a year ago I noticed a small lump in my left breast. Since then it has grown till it is now the size of a small lemon. It gives me a burning sensation and itches at times. I am 39 years old, but never had any breast trouble, and none of my people is afflicted with breast trouble. Do you think it is cancer and what do you advise?"*

REPLY.—See a surgeon at once. There is no cure for breast cancer or a tumor of the breast the size of a lemon (not a cancer) except operation. As this growth is so large and has pained so little it may not be cancer. If not, the lump should come out. If it is cancer the operation required is even more radical.

Might Be Cancer.—*T. J. writes: "What would a small lump in one breast mean, about the size of a common walnut? No pain or soreness in a woman of 45?"*

REPLY.—It might mean fibroma or cancer or retention cyst. Of these fibroma is the most frequent and cancer the most important. The absence of pain does not rule out cancer. Have an examination.

Pork Doesn't Cause Cancer.—*Mrs. J. B. writes: "Will you please answer in your column if there is any truth in the statement that cancer comes from eating pork?"*

REPLY.—No.

CHAPTER LII

Tumors

What is a tumor? This has always been a difficult question. Everybody knows the ordinary superficial appearance of a tumor—knows one when he sees it—but when he is asked what is a tumor he would probably have to answer, Why, a tumor is—a tumor.

What is the essential difference between the growths called tumors and growths and swellings that go by other names? In answering this question two principles stick out: the one that the mass of growing tissue feeds on the body but does no part of the body work; the other that the growing mass seems to have no limit placed on its growth.

Let us think about the first of these principles. The body is a commonwealth. Every tissue in that community has its work to do and the amount of food distributed to it is automatically determined by the amount of its work. The blood vessels come to have a size and arrangement that make it possible to carry the amount of food required; but as the amount of work varies, and therefore the amount of food must vary, the blood vessels are provided with muscles and nerves whose work it is momentarily to regulate, increase, or decrease the amount of blood going to the organ.

These things are worked out with scientific exactness and on the most approved basis of community life. It will be centuries before social commonwealths come to have the scientific adjustment that has always prevailed in the commonwealth called the human body.

In society we develop groups of parasites called paupers or criminals. In the human body we develop similar groups of parasites feeding on the body and doing no part of the body work and we call them tumors.

Some of these parasites are harmless fellows in a certain sense. They are drones in the hive. They eat but they do no work. At most they get in the way. In these passive ways they may indirectly do great harm and they may even terminate life. For instance, a fibroid tumor—and there are none more harmless—may grow in the windpipe and cause suffocation; or it may grow in the uterus and cause a woman to bleed to death.

Pursuing the parallel, a harmless parasitic tramp may innocently, if you please, become infected with smallpox and spread it over a good part of a state. Such an unusual occurrence has no bearing on the main point.

In the body politic tramps, hoboes and paupers, such by inheritance or whose status is fixed and unchangeable, are not expected to do much harm. They are parasites but until community life has been developed much beyond its present point society must make provision for the care of such burdens.

Along this line it is possible to distinguish between benign and malignant tumors. The pauper is content to be carried by society but toward it he

bears no ill will. He draws upon the thrift of others in so far as his needs demand but he has no quarrel with the thrift of any man.

The criminal takes a different view of the rights of property, life, and liberty. He is supported by the thriftier members of society—yes. He contributes nothing to society. He is free to do what he wants. This freedom grows out of the fact that the average man, in fact the great majority of men respect the rights of others. This feeling results in all law and custom being based on the idea that men want to be fair with their fellows. Liberty, therefore, becomes wise and proper.

The criminal in the exercise of his liberty is a parasite upon the general liberty guaranteed by the law. So far he is at one with the fixed pauper. Where he becomes different is in that he is an active enemy of society whereas the pauper is a passive enemy. He is not only a parasite on thrift but he is an enemy of thrift.

A fibroid tumor is content to draw its sustenance from the body and contribute nothing—and there the matter ends. A cancerous tumor is a parasite, contributing nothing to the work of the body and in addition pouring into the tissues substances which are harmful. Like the criminal and unlike the tramp it is anti-social and would destroy that on which it has been sponging.

The second principle is that tumors seem to have no limit placed on their growth. The tendency to automatic limitation of growth by the ordinary tissues is one of the wonders that are as non-understandable as electricity. We know what electricity will do, what laws it conforms to; but no man knows what electricity is.

We know that a certain cell in the human embryo will start out to make an arm, that it will multiply and its successors will develop until a certain size and contour is attained and there growth will stop. We say there is an inherited growth impulse which carries the arm about so far and its length having been reached the impulse automatically ceases. While this states the scientific fact it explains nothing. It leaves us no nearer an explanation than when we began.

In normal tissues the impulse to grow is in relation to all the other tissues. The two arms grow to the same length and stop, the two sides of the face develop evenly—everything fits in about right. In tumors the tissues destined to form the tumor pitch in and grow and continue growing without any relation to anything except the amount of food they can get. At times even a portion of a tumor will break down because the cells needing food have grown faster than the blood vessels supplying food. Outside of the food feature there is no automatic limitation on the growth of tumor tissue.

Society has not done much in the cure of its pauper and crime diseases. When we suspect a man to be an active or passive enemy of society we first diagnose his case and we then cut him out of society by placing him in a poorhouse, an insane asylum, a home, or a prison, depending upon what seems to be the best method for society to protect itself against that particular enemy. That is about as far as the science of community life has been developed.

When a man develops a tumor we first make a diagnosis, then we arrive at a decision as to whether the growth can be safely left alone or whether

it shall be cut out. Assuming it is decided that the growth is a menace the only treatment developed so far is to cut it out.

The foundation is being laid for a scientific study of criminality in its eugenics and environment relations. The cutting out way costs a lot of money for maintenance as well as a lot of strength by reason of its inefficiency.

Tumors are being scientifically studied with a view of finding something better than the cutting out method. These studies are taking three general directions. Some of them are trying to find the cause of the malignant tumors with a view to going after the problem along the line of prevention. Some are trying to find methods of detecting malignancy in its early stages; and some are trying to find a specific cure.

The group engaged in the first type of investigation at the present time is working upon the basis of a modified infectiousness. Many characteristics of cancers indicate that they are infectious though nothing indicates that they are infectious in the same sense that smallpox is. This group has succeeded in inoculating several types of animals with cancers. They have been able to pass these cancers through animals, cure it in some and then use a serum from cured animals with which to cure other animals.

The group which is trying to find a cure is working to find some form of a biological product, maybe an antitoxin, maybe a serum, maybe some other type of chemical substance, that will be destructive to cancer cells and harmless to other cells—some substance which will go into the body and pick out the cell for which it has an affinity and destroy it just as quinin will go into the blood and pick out the malarial organism and destroy it leaving all other cells pretty much as it found them.

The other group is trying to find some chemical or biological test of the blood or of the secretion from a cancer area that will serve to diagnose cancer earlier and more certainly than the microscope now does.

The old way of judging a cancer by its odor was of no service at all, for the sign was no good until the case was hopeless. The old way of judging by the history and the appearance was somewhat better, but very little. The microscopic method is a great improvement. Nevertheless it is to be hoped the research workers may be able to discover some serum test which will be even earlier and more certain.

The great New York Congress of Surgeons went on record in favor of operation for cancer on the basis of microscopic examination, provided the diagnosis is made early. So far as late cases are concerned every surgeon in the land would be happy if he were never called upon to operate on them. They advise against operation in such cases, hold out no hope for ultimate favorable results and are generally persuaded to perform such operations against their judgment.

If somehow the public could be educated to have tumors inquired into when they first appear, cancers would come to operation in their curable stages, for cancer is like consumption—curable in its early stages but incurable or nearly so in the later ones. The cancers that appear on the parts of the body that are under observation or are easily made so are often cured now.

The significance of a cough that holds on, of a little fever in the afternoon, of a little fatigue and tire has been learned by a million people within the last ten years and in consequence consumption is being diagnosed in its

curable stages. A part of the work of the committee appointed at New York will be to teach the public the meaning of early signs of cancer. Another part of its work will be to keep alive public interest in this subject until a way will be found to escape the present perplexities of the cancer problem.

Statistics show that the number of deaths from cancer is rising. I have not analyzed the figures closely enough to form an opinion as to whether the increase in cancer mortality is wholly due to the increasing age at death or not. It may be that like Bright's disease the rate of increase is disproportionately greater than the increase in the number who live to reach the cancer age.

Davenport in his chapter on the "Inheritance of Family Traits"—subdivision "Cancer and Tumor"—says:

"The question is are there human strains that are easily and others with difficulty inoculable? The whole question is complicated, as cancer is a disease of middle or later life. Thus, in the census of 1900, we find that the heavy incidence of cancer occurs between 40 and 80 years (84.4 per cent). The very high death rates are from 50 to 70 years.

"The answer to the question of heredity of cancer is to be found in a careful analysis and comparison of individual families. One then sees in many families no deaths from cancer among ten to twenty persons dying at cancer age, while in other families there will be even four deaths from cancer amongst those dying at cancer age. Such questions as these are suggestive of the many and varied points of the cancer problem."

See Your Physician.—*C. A. B. writes: "Is pain in a breast tumor always to be regarded with suspicion? I am 34 and for the last three years have had a lump in my breast. The lump appeared first shortly after I had weaned my baby, and at that time I was often conscious of a sharp, stinging pain, frequent but not severe. My physician examined the breast and said if the lump increased in size he would remove it. For a year or more it remained apparently the same, hurting only at intervals. Then it practically disappeared, although I could always feel a slight enlargement, as of a swollen gland. It gave me no further trouble until about a month ago, when it suddenly swelled to the size of a walnut and became quite hard. The pain returned and for several nights hurt enough to disturb my rest. I tried both hot and cold applications, and both relieved the pain. Then the swelling gradually receded until now it is almost imperceptible and I feel no pain whatever."*

Reply.—A cancer would scarcely change so in size. Nevertheless do not take any correspondence opinion on a point of so much importance. See your physician.

Lump in the Breast.—*Mrs. C. T. B. writes: "I have had a small lump in one breast for ten years. I noticed recently that this breast is larger than the other. There is no soreness. A physician told me when I first discovered it not to bother it unless it developed into something later. What would you advise? I am in good health and 31 years old."*

Reply.—A lump in the breast for ten years is probably not a cancer. Even fibrous tumors in the breast are not safe, and you should seriously consider having the growth removed. If you decide not, then have it watched by a physician, to whom you should go four times a year.

Tumor.—*C. E. B. writes: "Can a small tumor in the cul-de-sac be removed by absorption, or is an operation necessary? How does it affect the system?"*

REPLY.—Everything depends on what the nature of the tumor is. If it resulted from an infection and the infection has now subsided, most of the tenderness is gone. The mass may, and probably will, be absorbed. If it is a growth or is an enlarged, tender, displaced ovary the "tumor" will not disappear by absorption. If the trouble caused or the nature of the growth is such as to call for removal an operation will be necessary.

Each Case Different.—*J. E. writes: "1. How long would you advise the postponement of the removal of a fibroid, lemon-sized tumor, exterior but attached to the uterus? 2. What disagreeable symptoms should one expect? 3. How much inconvenience and disturbance should one endure before submitting to the expense, inconvenience, and possibilities of an operation? 4. If not removed at the age of 40, what later possibilities does it offer?"*

REPLY.—1. This question cannot be answered in a general way. It must be answered for each case. The answer depends on the rate of growth, the pain, and invalidism caused by it. A fibroid in that location in one 40 years of age is not necessarily a serious matter. It does not necessarily call for an operation.

2. Most of its symptoms will result from crowding the bladder and other pelvic structures. A fibroid in that locality seldom causes hemorrhage or gets infected. However, when there is one fibroid there is generally more than one.

3. Until it threatens to cause invalidism or semi-invalidism, unless it is growing rapidly, when operation should be done earlier.

4. Of greatest moment is the progressive increase in size after the change of life.

Let Doctor Decide.—*Adelaide writes: "I have had a lump in one breast for eight or ten years. I think it grows a little. What caused it and what would you advise me to do? Is there any application that will help remove it?"*

REPLY.—In all probability it is a harmless tumor. If so, let it alone. Put nothing on it. Do not rub anything on it. However, you had better have a doctor see it and decide whether it is cancer. If cancer it should be thoroughly removed. If it is not cancer let it alone.

Medicine No Cure.—*Mrs. F. R. writes: "1. What is a cystic tumor and where is it usually located? 2. What are the symptoms? 3. Can medicine remove it?"*

REPLY.—1. A cystic tumor may be located anywhere in the body. With one exception cysts consist of a bladderlike wall and a cavity filled with fluid.

2. The symptoms depend on the location.

3. No.

CHAPTER LIII

Crile's Method of Anesthesia

The nerves are the sentinels of the system by which the body is warned of enemies without. At the outside is the nerve ending which senses the foe and telegraphs the news. In the brain are the cells which receive the telegram, decide what to do about it and then telegraph the orders to the proper place.

There are certain parts of the body that have always been in danger zones. The nerve cells and fibers that have to do with those zones have learned by experience to be on the lookout; they are apprehensive and "keened" by fear.

There are other localities that are so well protected that they have never trained their nerves to be on the lookout.

The organs of the first group cannot be operated upon without danger of shock; those of the second are not easily shocked, according to Crile.

The brain, the lungs, the stomach and intestines, the deep structures of the back belong in the second group. Practically all the balance belongs in the first.

When a patient is anesthetized in the ordinary way, every cut of the knife sends an impulse to the brain cells. The patient is unconscious and in consequence does not suffer mental shock—the horror of being opened up. His sensations are paralyzed and in consequence he neither feels pain nor is he able to fight back.

The nerve cells at the center are being shocked, although the patient is asleep, feels no pain and is non-resistant.

Crile says: "We must therefore conclude that, although ether anesthesia produces unconsciousness, it is in reality only a veneer, as it protects none of the brain cells against exhaustion from the trauma of surgical operations."

The new method is the natural next step. It uses inhalation anesthesia, and it adds to it some procedures to cut off the sources of shock not cut off by inhalation anesthesia.

First, the patient is given morphin before the operation. A person under morphin is neither chesty, as after whisky, nor depressed; he simply does not care one way or the other. Then comes the ether, chloroform or laughing gas, whichever the surgeon prefers.

The operation is not begun until the field of operation is anesthetized with a local anesthetic. The idea is to cut the telegraph wires in the field of operation so that the messages cannot travel to the center.

The pain in and near the wound is fearful for two or three days after the operation. To prevent the shock from this pain Crile injects some quinin into the tissues near the wound. This anesthetic does not wear off for half a week.

The Crile method then consists in: (a) A dose of morphin an hour or more before the operation to prevent the mental shock of fear and dread; (b) ether, chloroform or laughing gas to prevent the mental shock and pain of the operation and to make the surgeon feel that he may take the time to do things as they should be done; (c) local anesthesia along the wound to protect the central nerves from operation shock; (d) quinin along the wound to save the nerves from the aftershock.

CHAPTER LIV

Eugenics

FOR RACE BETTERMENT

Many years before Galton's time eugenics had been trying to be born. Facts were being accumulated; theories were being tried out; the harm of bad inheritance and the advantage of good stocks were being referred to; society was sensing both the need and the method.

Galton, with good judgment and poise, gathered together a lot of this material, related the different parts to one another and made a community of what was just before a lot of separate individuals.

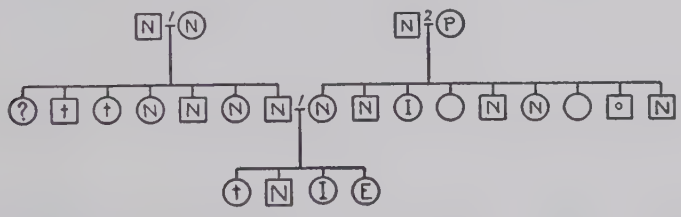


FIG. 402.—Pedigree of a family in which the father's parents (upper left) are both nervous (N) and have four nervous children. The mother is nervous; so were her father and four of her brothers and sisters, while one is insane. Of the three grandchildren one is insane (I), one epileptic (E), and one extremely nervous (N). (Cannon and Rosanoff.)

Factories have what are called assembling rooms to which are brought wheels and springs and bodies from all parts of the factory and in which these parts are put together to make the product. Galton assembled these wheels, springs and bodies with discretion.

In this sense he deserves the title of the "Father of Eugenics."

As the average run of people know but little about the assembling of facts and as they do know a good deal about the assembling of machines it seemed advisable to shift our metaphor from facts to machines. Now it is advantageous to shift it back again.

The custom is to name beings that are made. Galton got the science ahead by naming it eugenics—meaning the science of beginning well.

Most of the investigation as well as most of the legislation up to the present time has been devoted to those who have not begun well. Many of them (it is certain in the light of what we know) had no chance of beginning well. Therefore there are those who say that the science is not well named. This does not follow. The health department works nearly all of its time on ill-health; it spends its energies in studying disease; yet nobody proposes to call it an ill-health department.

Some day it will be possible to develop the work of increasing efficiency and well-being in a positive way until it is of equal importance with the work done now against unhealthy conditions. Health properly comprehends both points of view, both lines of activity. Health departments are not improperly named.

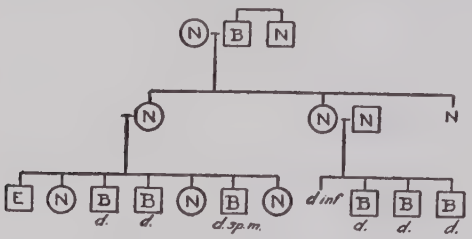


FIG. 403.—PEDIGREE OF FAMILY WITH COLOR-BLINDNESS (B). ("Heredity and Eugenics.")

I now speak of positive eugenics, meaning thereby everything which can be done in any proper way to encourage proper mating and the birth of children who begin well. By negative eugenics we mean everything which can be done in any proper way to prevent improper mating and the birth of children who do not begin well.

We are hearing more just now about negative eugenics. That side lends itself most readily to scientific and statistical study. By reason of the preponderance of literature and legislation on the side of negative eugenics it has been proposed to rename the science and call it dysgenics.

It was Galton's science and his right to name it should not be disputed. Besides, by the time you would get the new name accepted positive eugenics would be well developed and the onesidedness of the name now complained of would again prevail, the shoe being on the other foot. The science is well named. Let it alone.

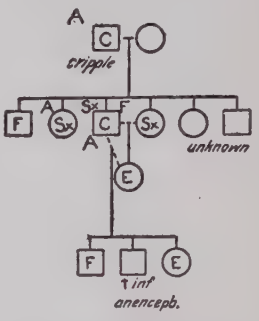


FIG. 404.—PEDIGREE OF FAMILY SHOWING DEGENERATION. ("Heredity and Eugenics.")

Dr. Goddard has recently issued a most interesting eugenics study of a family whose identity he hides under the name of the Kallikak family.

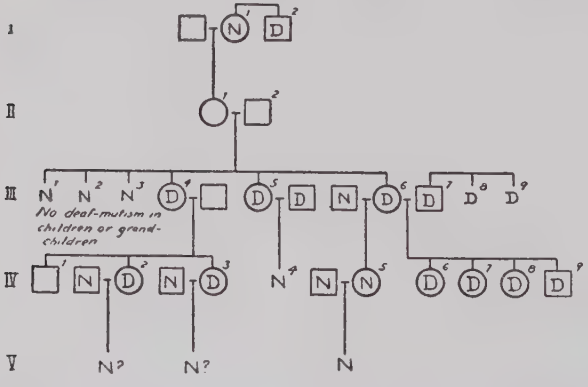


FIG. 405.—PEDIGREE OF A FAMILY WITH DEAF MUTES (D) IN A LARGE PROPORTION OF THE LATER GENERATIONS. ("Heredity and Eugenics.")

In his institution for the feeble-minded he had a girl whose degeneracy bore the earmarks of inheritance. He found that her great-grandfather had had improper relations with a feeble-minded, loose female character, the girl's great-grandmother, and that to them was born the girl's grandfather.

The great-grandfather had married a woman of good stock and they had had children.

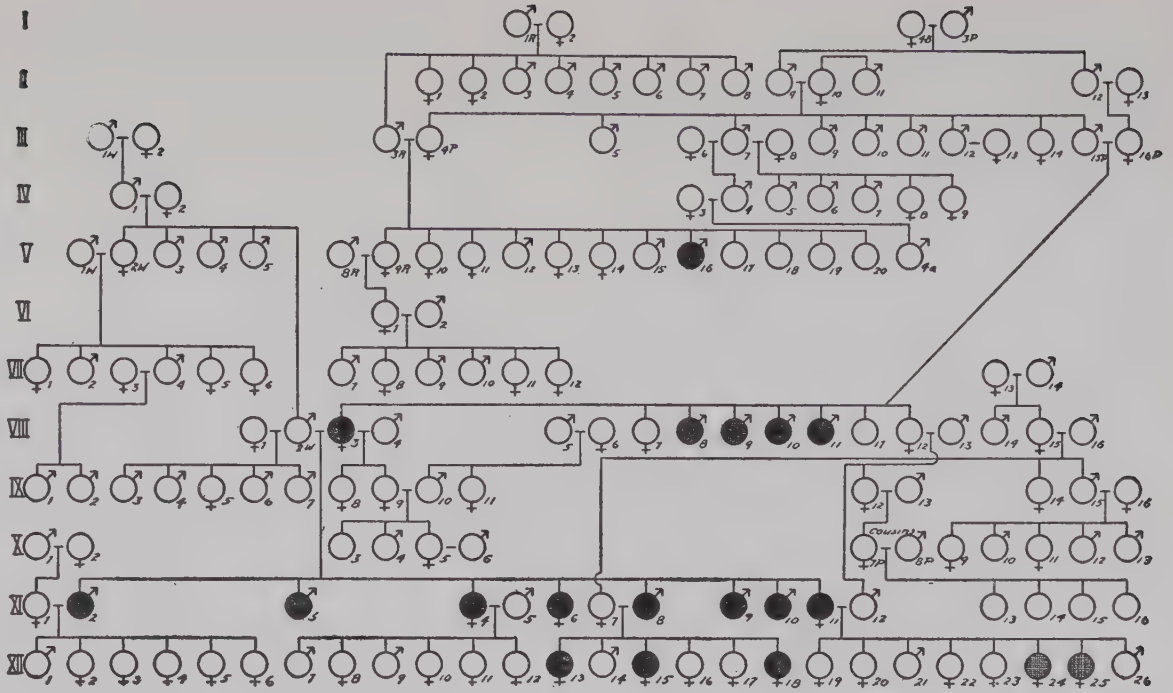


FIG. 406.—PEDIGREE OF A FAMILY CONTAINING ALBINISM (black symbols); SHADED SYMBOLS INDICATE PARTIAL ALBINOS; ♂ MALE; ♀ FEMALE. ("Heredity and Eugenics.")

These two parallel streams were started from one male head, one stream flowing into jails, insane asylums, and poorhouses, the other into the walks of highly respectable society.

The men and women of the first group are largely criminals, paupers, and insane; of the second, sturdy, high grade, good citizens. A study of the first comes within the realm of negative eugenics; of the second within that of positive eugenics.

The first is more easily studied and the facts disclosed are most dramatic. We shall hear much, as we should, of the millions of dollars that these degenerates have cost the state.

Martin Kallikak, the first, deserted his illegitimate offspring, but the community has been holding the bag. The taxpayers, including the legiti-

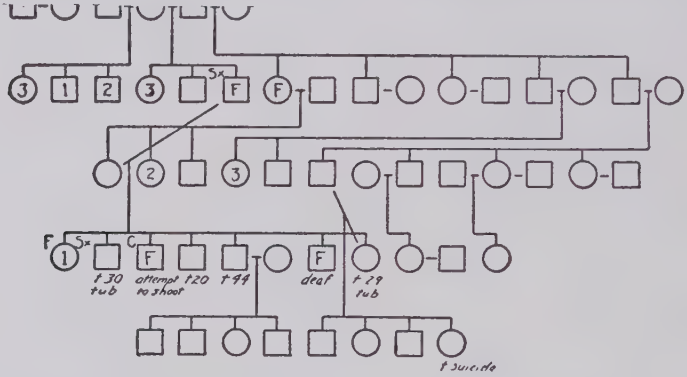


Fig. 407.—Pedigree of a Feeble-Minded Family in Which Criminalistic (C) and Licentious (Sx) Traits Also Appear. ("Heredity and Eugenics.")

mate descendants of Martin Kallikak, have been carrying the load that Martin thought he had dumped off the face of his earth. Martin was near-sighted.

As compared with the tragedy of the illegitimate line the story of the legitimate line is free from thrills. In consequence the study has been put on the illegitimate line, and the lessons drawn are widely circulated. There are some lessons to be learned from the legitimate line and a way should be found to spread the information gained from such study.

Someone has said that society takes care of positive eugenics in an intuitive way and that there is no need for teaching, to say nothing of research and study. The saying is that the admiration for, and the selection of, the strong, muscular, courageous male by the female and the fondness of the male for beauty in the female acting by natural selection constitute all the positive eugenics we need.

To this Havelock Ellis replies that under our present social demands the female seeks as her source of information Bradstreet or Dun and not the war record or the gymnasium showing of her prospective lord. When a female becomes infatuated with a prize fighter pity is the mildest emotion that her fellows bestow upon her. When on the other hand a female bestows her hand on some whiskey-soaked, disease-filled, lame and halt rake who has ample means her fellows are apt to approve.

It is also stated that the male has discovered the difference between apparent and real beauty in the female; that the apparently beautiful woman of the present day is largely dependent upon harness for her beauty and that this harness is destructive of native beauty and is also eugenically bad.

According to the view of these gentlemen whatever power making for positive eugenics lay in the customs of primitive society has been lost in the complications of modern society and at the present time we are worshiping at the shrine of a god that is mud and which has been since the days of the cave dwellers.

As right thinking men should, however, they do not propose to be destructive and there stop. They have a positive offering.

We are growing fond of the study of genealogy. Great numbers of books are written on the subject. With such writings great sections of libraries are filled. Family trees are worked out as the result of great study and these are conspicuously displayed.

The proposal of these gentlemen is that use be made of this demand and that some machinery be created to supply the demand.

First, that each individual keep his personal history embodying therein each fact that would or could have any eugenical bearing. Such a record should contain height, weight and some tests of muscular ability, a properly abbreviated medical history and an educational history.

For the purpose of this record mothers are to carry forward the interesting baby records now so frequently kept and to make them show similar facts as to childhood.

The baby record now referred to is that which commonly contains such items as date of birth, weight and length at birth, date of first tooth, date of sitting alone, walking alone, first word, date of different child diseases and disorders.

The proposal is that the record further show date of entering school, dates of making the different grades, weight and height at different ages and some estimate of physical and mental gains and losses. So much for the mother's record.

Out of these records, some accurate and some less so (as is the case with the data on which the genealogist now bases his findings) there will be built up family trees with eugenical value.

A necessity is that such trees should record the bad as well as the good. It must especially show the outcroppings of feeble-mindedness, insanity, epilepsy, drug addiction and certain types of criminality.

Galton has shown that there is a tendency to return to mediocrity. The children of a genius, of a man of great money-getting ability, of a statesman, exhibit tendencies to return to average capacities and average accomplishments.

The daring, the unconquerable courage that makes generals of finance and generals of war practically always gives way to safe and sane mediocrity in the succeeding generation.

Why then deify courage in a family tree since everybody knows that it peters out in the span of one life? Nobody is fooled.

On the other hand Goddard has shown that feeble-mindedness sticks.

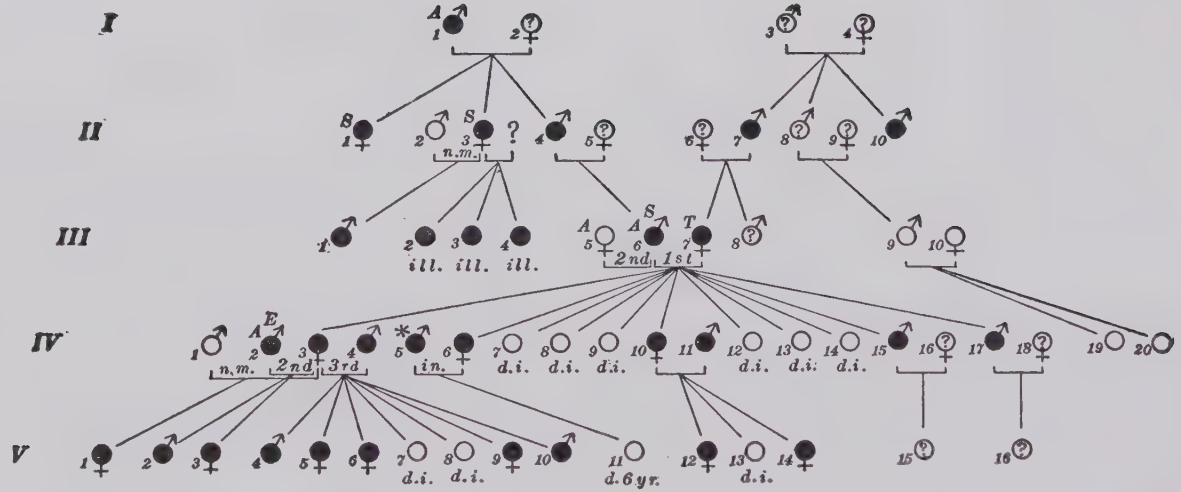


FIG. 408—FAMILY HISTORY SHOWING FEEBLE-MINDEDNESS. Data from Goddard. *A*, alcoholic; *d. i.*, died in infancy; *E*, epileptic; *ill.*, illegitimate; *in.*, incest; *, same individual as *III*, 6; *n. m.*, not married; *S*, sexual pervert; *T*, tuberculous. Black circles indicate feeble-minded persons.

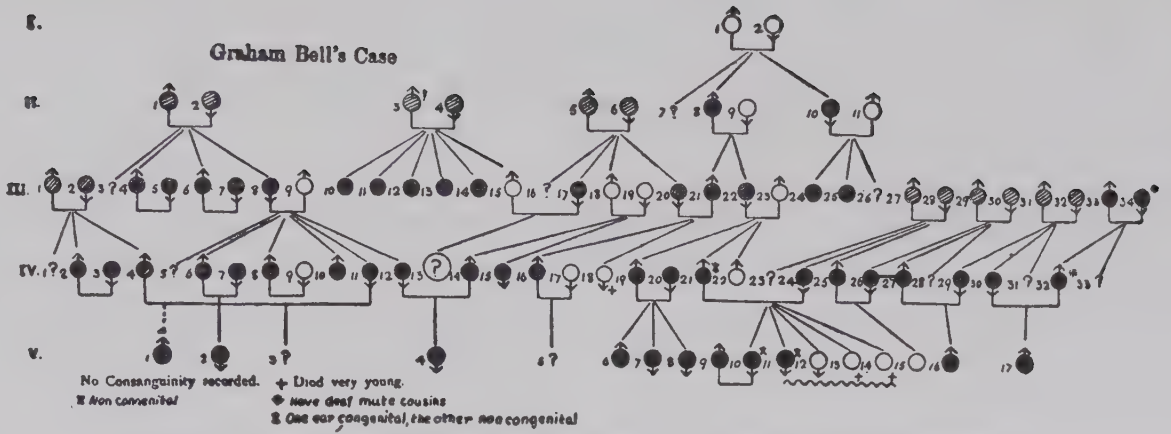


FIG. 409.—FAMILY HISTORY SHOWING DEAF-MUTISM. (From "Treasury of Human Inheritance.")

No change of environment will make any material difference. When it gets into the blood it stays and the proportion of actives and latents in a given generation can be determined pretty accurately according to Mendelian law.

These are two illustrations toward each end of the line. In between are a lot of items that are not so well worked out.

Scientists have not worked out the degree of disadvantage in having insanity in the blood, for instance.

Man is a mongrel. Follow up any man's family stream far enough

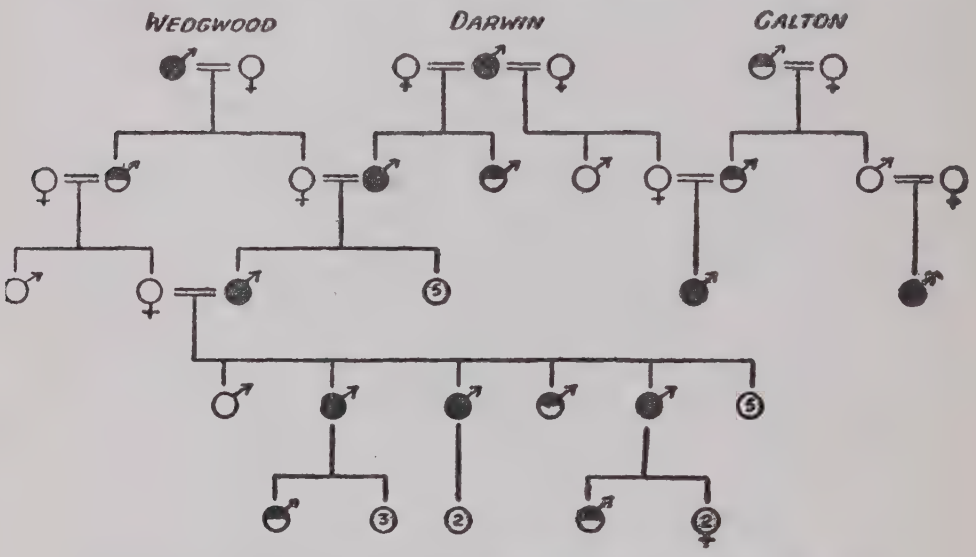

WEDGWOOD
DARWIN
GALTON
5
5
3
2
2
◓ shows a man of scientific ability; ● shows a man of scientific ability, who is also a Fellow of the Royal Society; (5) shows five other children, and so on.

FIG. 410.—HISTORY (CONDENSED AND INCOMPLETE) OF THREE MARKEDLY ABLE FAMILIES (After Whentham) (Kellicott).

and you will be certain to find some muddy ditches flowing in. How could it be otherwise?

The solution of the problems of eugenics, though, is dependent upon facts and we have the consolation that every stream tends automatically to purify itself, some faster, some slower.

The practical problem of eugenics is to keep the purification ahead of the pollution, and that can be done by working along two lines—by increasing the things that make for purification and by decreasing those that make for pollution.

It seems to me that Ellis' plan of a family tree is better than the old one. It does not frame so well or look so well on the library wall but it would be more serviceable.

In time a standard will be worked out and a normal line will be established; then those whose inheritance is above the average will have charts

made, framed, and hung in their libraries. Those below will keep their trees locked up; but they will strive hard to purify their blood stream.

COLLECTING EUGENIC DATA

"How momentous for the nations are the betrothals that are taking place this year!" Davenport exclaimed. Momentous for this nation are the weddings that are taking place this June and October. About 2,500,000 babies are born each year. About 2,000,000 survive the hazards of infancy. The additions to the population from immigration are large but the babies born far outnumber them.

The marrying couples are worth thinking about and enough is now known about the questions of inheritance to make that subject worth while for marrying couples to think about. Nor should thinking about the subject be limited to marrying couples. The marrying fever is liable to break out in the most unexpected places.

Davenport tells us in "Eugenics: Twelve University Lectures," that in the middle of the eighteenth century John Lowell, as he was being graduated from Harvard, vowed he would never marry. No doubt John Lowell meant what he said but in spite of that John Lowell married three times and from him descended the present president of Harvard; James Russell Lowell, the poet; Gen. Charles Russell Lowell, the soldier; the founder of Lowell, Massachusetts, and its cotton mills; a director of an astronomical observatory; the founder of the Massachusetts General Hospital; and many other distinguished public servants.

Fortunately for society, the young graduate, John Lowell, had within him a cosmic urge that the plans for his life had overlooked. Marrying concerned him though he vowed to the contrary.

Let us assume that marrying in our society is a matter of universal concern.

The Eugenics Record Office at Cold Spring Harbor, New York, has prepared a schedule for recording family traits. These are sent out upon request. They are to be filled out and returned to the office.

There are in that office about 10,000 family records. Not all or even a large part of these have been filled out by people asking advice about matrimony. Only about 2 per cent, or one in fifty, of the people who write in for these family trait blanks fill them out.

In only two cases in which marrying was not advised have the parties agreed to accept the advice. This seems a discouragingly small proportion. For the small result several causes are responsible.

1. Few people know of the Eugenics Record Office. It has never done anything dramatic enough to catch the attention of the general run of men.

2. There has not been time enough since eugenics was launched as a constructive program to convince people of its importance. Only a small fraction of the people understand that the program is or can be made personal. It is not generally known that this constructive program contemplates the preservation of the family unit and the promotion of the most attractive features of romantic love.

3. Even though the eugenic family tree as planned by this office only runs to the grandparents and their descendants the average person has not the information necessary to fill it out and will not take the trouble to get it. Many of the points inquired about do not stand out in the family mind as did such items as money, prominence and the like.

4. Some of the information asked for one hesitates to put on record anywhere. The Eugenics Record Office has always been careful not to expose anyone. The published reports designate families by such names as the Nam family, the Hill folk, and the like, to prevent unpleasant notoriety. Nevertheless, many people are conservative and therefore are unwilling to disclose information until such time as the continued trustworthiness of the record office shall have reassured them.

The record of 2 per cent of returns to the central office is by no means a measure of the results from sending out the family trait books. The person receiving blanks and instructions as to the information of importance at a time when his mind is concretely on the subject of matrimony will never forget what he reads in that book. He may not write to Cold Spring Harbor but that does not mean that he will not heed what he has read in the book.

5. Some trouble is required. A great many people who think themselves interested have only a psychological interest. If effort, change in habits or plans or customs is required they drop the matter. To them the prospective gain does not offset the trouble.

6. The rules for guidance which the eugenist can now lay down are too few to make a broad appeal. The subject is a new one. On some points it is possible to speak positively. In a few instances it is possible to say "Thou shalt do" or "Thou shalt not do." But on most of the points that people are interested in it is not possible to say anything one way or the other. This the eugenist knows better than anybody else.

It is to correct these defects that the office has been created, that ten thousand family records have been gathered and are being studied, that a corps of field workers are investigating, that the proposition to advise as to matrimony has been made.

Davenport is much more definite in his teachings than any of his associates. As to many qualities he speaks with the positiveness of a teacher. More than anyone he follows the plan of a great teacher of obstetrics of twenty years ago, Dr. W. W. Jaggard. Dr. Jaggard was accustomed to say:

"Gentlemen, I tell you this dogmatically to be accepted, not tentatively to be argued."

Davenport, though, after enumerating some fifty or more qualities concerning which eugenics speaks dogmatically finally said:

"The great work of the future in eugenics is to determine as accurately as possible the law of heredity of each human trait."

It is to this end that these thousands of family trees are being gathered. When eugenics has developed its doctrine it will find the people ready to accept it. In fact the people will be ready before the doctrine is ready.

I believe it was Sir Francis Galton who suggested the eugenics family tree and the development of a regenerated romantic love around the central idea of family trees. Immediately following his suggestion individuals began

keeping life albums in which there would be entered the intimate personal history of individuals, and families began constructing family trees along the lines laid down by Sir Francis.

The Family History Book, issued by the Eugenics Record Office as Bulletin No. 7, gives detailed instruction as to how to construct such a family tree. In the record there is a place for an analysis of the capacities, likes, dislikes, peculiarities, and other qualities of the individual.

Some day the plan will be modified so as to enter certain desirable qualities with the ease of entry now provided for certain bad qualities. A glance at the plan as now outlined shows that the work has been done by men whose chief interest has been in the abnormal.

We find a key in which fifteen inheritable undesirable attributes are to be noted by a single letter: A, alcoholic, decidedly intemperate; B, blind; C, criminalistic; D, deaf; E, epileptic; F, feeble-minded; G, gonorrheal; I, insane; M, migrainous; N, neurotic; P, paralytic; S, syphilitic; Sx, sexual, immoral; T, tuberculous; V, vagrant, tramp, confirmed runaway.

In this list there is one symbol for the desirable—N, normal—and one to designate an infection that is not inheritable—G, gonorrheal.

Further analysis is necessary in many of these entries and therefore such suggestions are made as that the capital I for insanity should be modified to make, for instance, Is, senile dementia; Ig, general paresis; Ip, paranoia. All these differ in their importance from the inheritance standpoint.

Davenport tells us that in this country there are aristocratic families, such as the Harrisons, statesmen; the Morgans, financiers; the Edwards and Dwights, scholars; the Wilkinsons, inventors; the Lees, soldiers; the Hulls and Footes, sailors; the Jeffersons, actors.

There are cacogenic families such as the Jukes, Ishmaelites, Nams, Hill folk and Kallikaks, a large portion of whose descendants manifest criminality or some other evidence of subnormality.

If one marries into the one group the majority of the offspring will be a source of happiness to the family. If one marries into the other group a majority of the offspring will be a source of misery to the family.

Some of the inheritance relations of the above have been well worked out. Some have not.

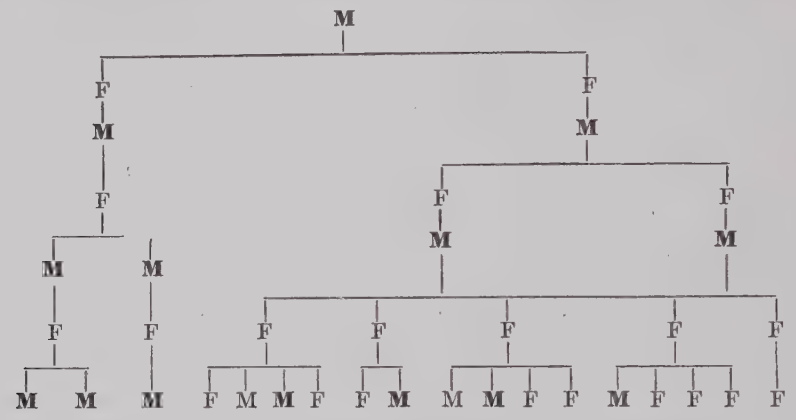
The blood will clear itself of any inheritance in four generations. This statement requires some modification. There are a few qualities that cannot be bred out. Those are pretty well understood. They conform to developed principles of Mendel's law.

Occasionally a quality will appear that has not appeared elsewhere in the family tree which goes back three generations—to the great grandparent. In such case the Family History Book tells us that the searcher delving farther back will find some forerunner.

These are the exceptions; the rule is that four generations is enough. In some instances it is more than enough. For instance, gonococcal infections are usually included. This infection produces sterility, causes blindness in the newly born child and in other ways is related, but in no proper sense has it inheritance features. Two generations clears the stock of both the infection and the effects of the infection.

Syphilis, on the other hand, extends "even unto the third generation"—but not beyond that. Alcoholism, epilepsy, insanity, migraine, wanderlust, tuberculosis, neurasthenia, are qualities from which the stock clears itself by the fourth generation if given any chance.

The tendency to normal mind, normal stamina, normal resistance, to epileptic convulsions, to a certain color of skin and eyes is marked. It is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are not observed. Among the self-limited traits are color blindness, atrophy of the optic nerve, hemophilia, muscular atrophy, multiple sclerosis, nystagmus and myopia.

This is only a beginning. The Eugenics Record Office will not succeed until it offers a program with a broader appeal. In order that it may do so it is piling up studies.

THE OPTIMISM OF EUGENICS

Some of the opponents of eugenics have ridiculed and maligned it because, they said, every man's family tree goes back to the beginning and it is therefore a reasonable certainty that among any man's ancestors were some who had inheritable defects, physical, mental or moral.

Had these critics taken the trouble to inquire they would have learned that the blood has a tendency to clean itself and that the great teaching of eugenics is in the laws of cleaning.

Irving Fisher in *Good Health* says: "Thus it is possible to apply the laws of heredity as laid down by Mendel in a thoroughly practical way and to get results in one short generation. It seems, and it is, a colossal task to change average human nature one iota. Yet in the light of modern eugenics, we could make a new human race in 100 years if only people in positions of power and influence would wake up to the paramount importance of what eugenics means."

Professor Fisher quotes David Starr Jordan's report on the lessening of cretinism in Aosta, the result of a ten-year effort.

Most of the bad qualities are recessive. That means that the blood clears itself of them if it has any chance to do so. This power of the blood to clean itself is so strong that the human race holds its own well in spite of the haphazard lines along which it has been run.

The eugenists propose that in the case of those bad conditions that are dominant (the blood not having much power to clean itself of them) propagation shall be prevented but—and this is the part that they especially insist upon—that study shall be made of the natural laws by which the blood clears itself of the recessive defects and that the people shall be educated to make use of the information gained.

When Galton launched the eugenics movement he called it a eugenics education movement. There has never been any killing of babies or infanticide or breed-'em-like-hogs proposals even from the followers of the movement and certainly none from the leaders of the movement.

The influence of heredity does not go back indefinitely. To consider the parents is the main necessity.

However, that is not quite enough. A little thought should be given to the four grandparents and all who have descended from them. Some thought must be given to the eight great-grandparents and their descendants. That is about all.

A man need be interested only in about one-half the defects found among his first cousins and one-quarter of those among his second cousins.

The most important part of eugenics is its teaching as to what are

good limbs and what are bad limbs on a family tree. Of importance is the teaching that a family tree need not go back into more than three generations.

Of great importance is it that the young person live cleanly not only because it is the proper preparation for parenthood but because he is the temporary custodian of the seed of the race.

PROBLEM OF THE FEEBLE-MINDED

Recently, when I was in Momence, Illinois, two most intelligent gentlemen told me of the large number of feeble-minded along the Kankakee valley. There is much intermarriage amongst the families in which the strain runs, and in consequence the condition is on the increase.

The people of the district referred to do not change location often. They show a disposition to stay in the neighborhood wherein they were born, to marry neighborhood girls, to rear their families among old friends and (their lives coming to the end) to be buried in the neighborhood burying ground—the wisest and best of plans if there is combined with it efficient supervision of the stock to keep feeble-mindedness out; the worst of plans once a transmissible condition like feeble-mindedness gets into the stock.

In his address before the state charities commission Dr. Henry Goddard, who knows more about this subject than anyone else, estimated that there are 20,000 feeble-minded in Illinois.

What the feeble-minded cost the state there is no way of telling but the sum must be enormous. No accurate compilation has been made of the crime which may justly be laid to the mental inferiority of its perpetrator. The mental defective is a positively aggressive enemy of society whether it be through a large progeny or criminal activities, or both.

Based upon views of this character Dr. Goddard advises that legislation be passed. Just what this legislation is to be is a difficult question to decide.

The best authorities are of the opinion that some of the states have gone forward too rapidly in their negative eugenic laws. Such opinion is strongly put in the last bulletin from the eugenics laboratory, that on the marriage laws of the United States.

The English have been worried about the problem of the feeble-minded. Their people stay even more closely in their neighborhoods than the people of the Kankakee valley. When feeble-mindedness gets into a family intermarriage and marriage among neighbors tends to increase it.

The British parliament appointed a committee to investigate the subject. Dr. Goddard tells us that no subject before that body has had more earnest consideration than the mental deficiency bill and that when it finally becomes law it will probably be a fit example for other countries to follow.

David Lloyd-George has succeeded in turning the thought of English statesmen to problems of this character. Perhaps he could not have succeeded had not the Boer War made the English introspective.

If, as a result, solution is found for some of the ills of society the world will be the beneficiary of that unfortunate contest.

EUGENICS CONCLUSIONS

Salaman, studying the facial expression of English Jews, found in 136 families where the father was a Jew and the mother was a Gentile that there were 336 children with Gentile faces and 21 with Jewish. In five families where one parent was a Gentile and the other half-Jew and half-Gentile there were 11 Gentile faces and none Jewish.

Jews are supposed to have about as fixed a facial type as is to be found. That was the reason for the study. Therefore Jews marrying out of their race will have children with Gentile faces in nearly all instances. Those children, marrying an out strain, will have no children with Jewish facial characteristics.

Ewart, studying the 105,000 inhabitants of Middlesborough, England, came to these among other conclusions:

"1. The children of the better working classes are above the average standard of those of the professional classes.

"2. A mother produces her best girl before her twenty-fifth year, and her best boy in the twenty-six to thirty year period. Add five years to each group and the figures apply to fathers.

"3. Children born in the first half of the year are larger than those born in the second.

"4. No pregnant woman can nurse her child at the breast without having the unborn or the born child suffer. When children come far enough apart (three years), so that the woman is not nourishing a born and an unborn babe at the same time, the majority of mothers improve as child bearers as their families increase. The third averages better than the first or even the second. When children come at a shorter interval than two years, the later children are not so strong mentally and physically as the first."

The quotations from recent writings on eugenics have been given with a view to stimulating interest in a greatly neglected subject.

In Davenport's book nearly every physical, mental and moral trait is given some consideration. However, it is all so new that neither Pearson, presiding over the Galton Laboratory in England, nor Davenport, presiding over the Eugenics Laboratory in this country, has facts enough for final conclusions. But the subject is so important that it must not be neglected longer.

Statistics show that men and women of bad stock have twenty-five per cent more children than normal. The flowers must have a chance to outgrow the weeds. Nock says England's mournful lesson is that you cannot have national greatness bottomed on unsound men and women. Unsound men and women result from bad environment and bad heredity. The first is the more important; but the second deserves more thought than it has had.

Mental Defects.—"Two mentally defective parents will produce only mentally defective offspring."—Goddard.

If a person belonging to a strain in which a mental defect is present marry a cousin the chance of some defective children is very great. When two persons of strong minds but with mental defects in their blood strain marry, one-fourth of the offspring may be expected to be mentally defective.

Mongolians.—(Feeble-minded children, looking somewhat like the

Chinese type.) "A Mongolian is usually the youngest or oldest child, the last or the first born. Such a child is born to a mother (or occasionally a father) who is too young or too old, or who, for other reasons, is in a bad condition of nutrition."—Davenport.

There is a eugenic relation between genius and feeble-mindedness. Says Havelock Ellis: "It is no paradox to say that the real affinity of genius is with congenital imbecility rather than insanity." He notes that eminent men are more apt to be eldest or youngest sons.

Memory.—"When both parents, having poor memories, are from families so characterized, few of the children have excellent memories. When one parent has a fair memory and the other has a poor memory, all children have poor memories."—Davenport.

Criminality.—Davenport, from whose book these illustrations have been

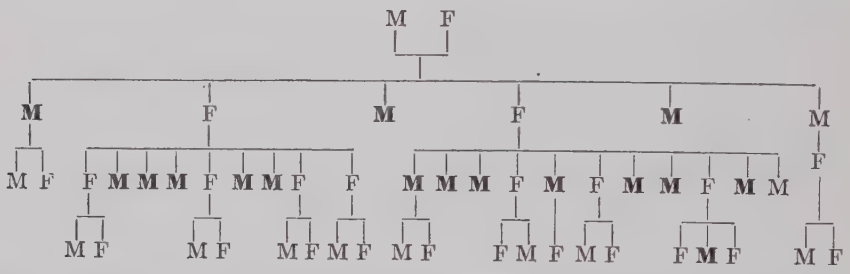


FIG. 413.—PEDIGREE SHOWING HEREDITARY TRANSMISSION OF HEMOPHILIA. Bold-faced type indicates bleeders. ("Heredity and Eugenics.")

drawn, says: "It is just as sensible to imprison persons for feeble-mindedness or insanity as to imprison criminals who are of a criminal strain. The question whether a given person is a case for the penitentiary or the hospital is not primarily a legal question, but one for a physician with the aid of a student of heredity and family histories."

Hemophilia.—A disease characterized by frequent, almost uncontrollable nose bleed; the afflicted are known as "bleeders."

Eugenic teaching—Sisters of bleeders should not have children. Males, whether bleeders or not, may marry and reproduce with impunity. Their descendants will not be bleeders.

Cancer.—"This disease is much more frequent in some families than in others. Children born to old parents are more liable to have it than children born to young parents or parents in the middle of the reproduction age."—Ewart.

TENDENCY OF BLOODS

In a certain "Village consisting of 1,000 Souls" (Gesell tells us), there are 220 families. He studied the life history of these people from 1880 on and classified them according to eight conditions: Feeble-mindedness, insanity, suicidal impulse (successful accomplishment), alcoholism, epilepsy, criminality, eccentricity and tuberculosis.

In thirty-three years no member of 111 of these families has shown any

manifestation of any one of these conditions. In 109 families the stock was found tainted by one or more.

Numerically the two worst family records were one in which there were three cases of tuberculosis, one of insanity and one of alcoholism, and another in which there were two insane, one suicide and two eccentrics.

Nine of the families had four subnormals each. In one of these families there were four feeble-minded; in another there were two insane, one feeble-minded and one alcoholic. Out of the thirty-six members nine were insane, five were feeble-minded and seven were tuberculous.

Ten of the families had three subnormals each. In two there were two feeble-minded in each and in one there was one. Two had two insane each and two had one each.

Twenty of the families had two subnormals. Two of the families had two feeble-minded each and ten had one. Two families had two insane each. Forty-one of the families had two or more abnormal members. In the 220 families there were 187 subnormal individuals. Two per cent, one out of fifty, of the pupils in the public school were feeble-minded.

Gesell found it difficult to classify two eccentric druggists, a hard-hearted stepmother, the local banker who lost the savings of most of the people, one bigamist who used the money secured from the second wife to provide comforts for the first wife and her children, and three young men who became vagrants.

A point indicating decadence that I have never seen noted before is the tendency of men and women in this village to come to a standstill at about thirty-five. A good stock grows in intellect and power to a later life period. So much for one side.

As for the other side nine of the families produced fourteen quite superior individuals. Several ball players in the National League came out of this town.

Of greater significance is the mediocre stock of this village—just the ordinary, everyday people, the common run of people, the people who go through life raising their families, carrying on the everyday work of the town, neighborly, helpful, practicing the homely virtues.

In this village this group makes a good showing. There is that tendency to stop growing in capacity at an early day but almost every other observation indicates that the mediocrity of the village is getting on quite well.

As Gesell says, "Feeble-mindedness tends to be transmissible, but so does normality." The proof is conclusive that bloods tend to cleanse themselves. With a little study and planning the stock can be protected against the subnormals. But help is needed. It is needed in the quiet, peaceful, happy villages as well as in the city slums.

THE SURVIVAL OF THE FITTEST

When the movement for the conservation of health began to attract the attention of the indifferent there were those who lent it no aid, and even at times opposed it because they believed in Herbert Spencer's doctrine of "the survival of the fittest."

Before the Chicago City Club Mr. Bridges of London called attention to the difference between the ordinary idea of what this doctrine meant and Herbert Spencer's idea. The survival of the fittest means the survival of those fittest to survive and that is all. The best of a race are not necessarily the fittest to survive. The advancements are always made by those who are a little out of joint with the times. When the average has been adapted to advanced standards the force for advancement becomes the fittest to survive but when it does it is no longer a force for advancement.

A judge who in his decisions sticks close to precedents will have few reversals—an offshoot of the idea of the survival of the fittest. But on the other hand he will petrify the law. Justice is carried forward by men with a sense of social justice directed by judgment. Such men are often reversed. As Mr. Bridges put it, if a polar bear and a Lincoln were set down on an arctic island the bear would survive because he was fittest.

Galton uses the term "worthy" as meaning those who should survive and who can do so when society is so organized as to make for race betterment.

Another influential group has opposed the entire health conservation movement both in its hygiene and in its environment features because, they have argued, the policy served to keep alive many who (for the benefit of the race) should not live; that in the long run the race would be better off if the weaklings were allowed to die.

When in a state of savagery man has acted upon this conception with brutal directness. The lame, the halt, the weaklings, the excess of females—any who in the judgment of the masters were thought to be, or liable to become a burden were killed and custom and law held the murderers justified. As civilization came on a bit outright murder stopped but murder by neglect was countenanced.

The next step in the evolution was neglect, but neglect short of murder. The successive steps following were poorhouse care, asylum care, humane care, curative care which brings us to where we now are, preventive care; at least, we are at the dawn of this era.

If the idea of those opposed to the policy of human conservation because of their belief in the survival of the fittest was correct why is it that society has been evolving away from the old habits?

Man's tendency is always upward. The constant trend from savagery (even when it be justice to humanity) must be right because it is the trend.

Again, the death rates are getting low, invalidism less, the average of efficiency higher—the newer ideas must be right, the older ideas must be wrong.

Scientists find ample demonstration of the truth of this logic. Care of environment and thought for inheritance mean lowered death rates; they also mean heightened health rates.

Havelock Ellis says: "In a policy of the survival of the fittest the fit survive, but though the relatively strongest have survived, their relative strength has been impaired by the very influences which have proved altogether fatal to their weaker relatives."

"Furthermore," he elsewhere adds, "not only must an undue struggle with unfavorable conditions enfeeble the strong as well as the weak; it also imposes an intolerable burden upon these enfeebled survivors. It involves

the multiplication of the diseased, the maimed, the feeble-minded, of paupers, lunatics, and criminals." To which might be added neurasthenics.

A convincing demonstration of the truth of this conclusion is given by a comparative study of the death rates of the countries where the infant mortality is high and those where the infant mortality is low. Without exception those countries where the infant mortality is high have an adult mortality rate which shows that sickness in childhood undermines resistance for the rest of life.

For instance, Russia where the infant mortality a few years ago was more than 300 and still is over 250 has much more sickness and a much higher adult death rate than Norway which has a low baby death rate.

As Carpenter puts it, "A high infantile mortality means a far higher infantile deterioration rate," or as someone quoted by Ellis puts it, "A dead baby is next of kin to a diseased baby."

From no standpoint is a nation justified in neglecting its people. Or to quote Goldscheid: "The protection of the weak is the protection of the strong against degeneration."

"UNTO THE THIRD AND FOURTH GENERATION"

The above was selected as the title for a paper to be read before the Canadian Medical Association by Professor Adami of McGill University, Toronto.

Many years ago Weismann of Freiburg University, Germany, wrote that environment was of no importance and inheritance was all important in shaping the destinies of men. His teaching was that the cells of the body fell into two groups—the somatic cells (including all cells except those of generation) and the generation cells which in the developing child were the progenitors of all the cells but that thereafter originated only cells of generation.

Somatic cells sprung from generation cells but the chain having started, they were thereafter produced only by somatic cells. Generation cells originated from generation cells always and could never originate otherwise. Somatic cells inevitably died but the germ plasm acting through generation cells was perpetual.

The practical effect of the teaching of Weismann is that the germ cells are wholly protected from the influence of environment—for instance, that whatever may be the experiences of a woman her children will not be affected. Parents are born with all their germ cells complete and finished.

There is, of course, much truth in the dogma of Weismann, though even the last modification of his views is not thought to be the whole truth. Studies have shown that the grandchildren of people who have consumption are highly susceptible to the disease. Susceptibility may even skip the first generation and appear in the second—the sins of the fathers visited upon the children even unto the second generation.

In Adami's opinion, the results of one's living are manifest even unto the third and fourth generation and he sets forth in this paper his reasons for that belief.

Of course his is not a one-sided belief. Those who live right impart the

good gained to their descendants just as those who live wrong impart the harm done to theirs.

The term "sin" is used entirely with a scientific and not with a moral meaning.

He quotes experiences that show that lead, mercury, and alcohol effects are carried over into succeeding generations. He also makes use of observations on poisoning with the toxins of tuberculosis and certain other diseases where proof is somewhat easy to make.

Adami says that when Weismann cut off the tails of mice and from these bobtails bred long-tailed mice he proved that a race of bobtailed mice could not be bred in that way but that was all that he proved.

The action of the important organs of the body and the resistance to delicate chemicals is much too subtle to conform to the same laws as regulate the tail of a mouse.

There is proof that subtle changes do result from change in environment. Besides, it is common sense. Individual man is influenced by his surroundings and in time the race comes to feel the influence though the cells charged with carrying on the race are better protected against outside influences than are the cells that do the day's work.

THE BABY SCIENCE

We have been so busy with environment that we have forgotten team work. Race betterment is loaded in a two-horse wagon, to which are hitched improved environment and eugenics. The horses wear blinders. Improved environment (including the workers for its improvement) has been so busy pulling on its end of the doubletree that it has forgotten the fellow on the other side of the pole.

Sir Francis Galton calls eugenics "the science which deals with all influences that improve the inborn qualities of the race"; which Davenport further clears by saying:

"The eugenical standpoint is that of the agriculturist who, while recognizing the value of culture, believes that permanent advance is to be made only by securing the best blood. Man is an organism—an animal—and the laws of improvement of corn and of racehorses hold true of him also. The success of a marriage from the standpoint of eugenics is measured by the number of disease resistant, cultivable offspring that come from it."

Davenport in his "Heredity in Relation to Eugenics" has set forth many eugenical principles. That the science of Mendelism has proceeded far enough in the human subject to permit of eugenical formulae covering so many fields will come as a surprise to many.

Mendel, the Austrian monk, wrote the story of the breeding of the sweet pea a quarter of a century after the railroad was invented. He made his experiments, recorded his results, wrote his book—and died—his life a failure so far as he could see. When William McKinley was president, Devries happened to read this little book and seeing the seed of a science in it found for it a hearing.

Most of Galton's writings were during the presidency of Cleveland, Mc-

Kinley, and Roosevelt. It was in 1911 that he died leaving his estate as an endowment for this work. The bulk of the literature on the subject has been written since Taft became president.

Not much senility about a science which runs back only to the last Roosevelt administration! A baby science immature in years will certainly be immature in its conclusions and error will creep in. Some of its present principles will be abandoned in the light of broader information and others will be modified. But the methods and the general outlines will stand.

Davenport says: "As we may now predict with precision the characters of the offspring of a particular pair of pedigreed poultry, so may it some time be with man."

We will all agree with Nock that man made laws will never supplant the laws of nature. Even the laws of custom and society will yield slowly where they yield at all. The students of eugenics as a general rule think the regeneration of the race will come about more through intelligence and information than through legal enactments.

Medical examination and certification as a basis for a marriage license is not advocated by Havelock Ellis, Newsholme, Saleeby, Davenport and Hutchinson. They think that some of our state laws have gone too far or rather too fast having been enacted without enough preliminary study. Asexualization of the very lowest strata of society is about as much as they are ready to advocate. They propose to state the known facts and the principles deducible from them and then to leave the results to the wisdom of men.

While the majority of men will drift along as heedless as ever a fair number will give some thought to the subject, knowing that unwisdom will be "visited upon their children and their children's children even unto the third and fourth generation."

Now let me set down a few selections, principally from Davenport's work, illustrating what eugenics is teaching:

Deaf-Mutes.—The first eugenic recommendation is that two deaf-mutes should not have children especially if they come from the same long settled community or are known to be blood relatives. Bell, in a special census report to the United States government in 1906, showed that intermarriage was a very important cause of deafmutism. Where a deaf person has inherited his deafness about 25 per cent of his children will inherit deafness. Where a deaf person has acquired deafness through neglected tonsils, and such causes, 2 per cent of his children will be deaf.

In a marriage where one partner is congenitally deaf and the other has no deafness in the family 7 per cent of the children will be deaf. If the partner with good hearing has deafness amongst his relatives 35 per cent of the children will be deaf. If one or both partners are deaf as the result of neglected tonsils, ears, or other defects, and have no deaf relatives only one-quarter of 1 per cent of the children will be deaf.

Becoming Hard of Hearing with Age.—Two persons with this as a family tendency should not marry as probably all their children will be "hard of hearing" as they grow older. But a person with such a family tendency could marry into a family with no such tendency and the children would have no such tendency.

Blue Eyes.—When both parents have pure blue eyes all the children will have pure blue eyes.

When one parent has brown eyes, while the other has blue, either the fraternity of children will show no blue eyes or half of them will be blue eyed —more accurately, 48 per cent and 52 per cent.

When both parents are brown eyed, 75 to 100 per cent of the children will be brown eyed and no per cent to 25 per cent blue eyed.

Color Blindness.—The eugenical conclusion is that while color blind males will have no color blind sons and (typically) no color blind offspring of either sex yet their daughters married to men of normal stock will have color blind sons.

Cataract.—The eugenical rule is that if either parent has cataract at least half the offspring will have it also.

Cretins.—Absence of the thyroid gland, the opposite condition to goiter, appears especially in families which have intermarried for several generations. There is a large cretin colony in Switzerland. For some time these have not been allowed to intermarry and Jordan, in the *Eugenics Review* for 1910, says that cretinism has about disappeared from the village.

Exophthalmic Goiter.—This is clearly inherited, as certainly as epilepsy. The laws of inheritance have not been worked out.

Neurotics.—In a certain case where a nervous person married a neuropath of eleven known offspring six are normal and five neuropathic. Where two neurotics married two out of six children are normal and one insane. Where an insane and a normal married of thirteen children four are normal and two insane. Where a neurotic and a normal married of twenty-eight children sixteen are normal, nine nervous, one feeble-minded and two insane.

Multiple Sclerosis of the Nervous System.—This disease is transmitted through unaffected females. The eugenical conclusion is that unaffected females who have affected brothers should not have children. Neurotic parents will have about 50 per cent of neurotic children.

St. Vitus' Dance.—Occurs in families of a neuropathic make-up.

Insanity, Alcoholism, Drug Addiction.—Says Davenport: "Probably an hereditary predisposition lies at the basis of most cases of insanity, and this predisposition behaves in heredity like a defect." Alcoholism and drug addiction as modified insanities belong in this group.

Cancer.—"There is a family liability to cancer, but along what lines this liability is transmitted and what plan shall be pursued to prevent its transmission has not been worked out."—Davenport.

Consumption.—Coolidge says that old New England families show a relatively high resistance to consumption as compared with recent immigrants. The opinion is quite generally held that the mortality from this disease among negroes and Indians is due in part to bad hygiene but in greatest part to the fact that the disease is to them a new one. They have an inherited susceptibility to it.

Davenport's study of the family histories in his eugenics files shows some with no consumption, others with little and some with a consumption death rate of 75 to 80 per cent. He concludes that children of families with a tubercular history should not intermarry.

The above illustrations have been drawn in miscellaneous fashion from

"Heredity in Relation to Eugenics." The principles are based on data which in most cases are abundant enough to prevent errors due to individual variations. In some instances there are enough data to meet the requirements laid down by Pearson for the law of probabilities; in most instances, far from it.

THE HILL FOLK

The man who lives in the country reads of the unworthy citizen and the slums of the city in a detached way thinking of them and all such much as he thinks of aborigines in Australia or pygmies in Africa. As a matter of fact the only studies of bad family inheritance ever made in this country have been of rural families.

The Eugenics Record Office has recently published another of these family studies under the title "The Hill Folk." It is the story of the descendants of two men who came into a small Massachusetts town in 1800. The town, now with 2,000 inhabitants, lies in a fertile valley surrounded by less fertile hills. The population in the main consists of industrious, intelligent farmers.

Through this placid mass of good citizens the progeny of these two bad citizens has sifted making desolate, alcoholic homes and furnishing wards to the state for over fifty years.

The taxpaying, law abiding citizens have lived beside these troublesome paupers so long that they are too disgusted with them and also too accustomed to them to do anything.

About every so often one of the Hill folk goes to jail or to some other institution and the people temporarily threaten to do something about the whole worthless stock. But it stops at that.

The cost to the taxpayers for caring for these Hill folk has been a little short of $500,000.

The first generation or two cost little or nothing thus limiting the years on which the cost has fallen to about the last fifty. The average cost has thus been about $9,000 *a year, a pretty good price for a community of law abiding, frugal farmers to pay for the luxury of paupers, drunkards and criminals by inheritance.*

In the last ten years the cost has increased fourfold so the promise is that Mr. Farmer Neighbor will have to dig down into his jeans a good deal deeper within the next ten years.

About every so often the good people have been so aroused at boys getting drunk and girls going wrong that some officer has gone among the Hill folk and taken the children to some public or philanthropic institution. Whereupon the drunken parents, relieved of the need of finding bread for their brood, have proceeded to raise another brood.

The neighbors having never studied the problem the Eugenics Record Office has become intent upon digging right down to the roots. What has been found out about this family may not be of service to this Massachusetts village that has suffered the nuisance for a century but it may be of service to communities that are just beginning to get a "katzenjammer."

For instance, they find that half the school children of this family show evidence of mental deficiency. As their mental weakness shows a

tendency to make habitual drunkards of them one might say that communities which pass prohibition laws are striking at the root of the difficulty, are not idly drifting in the face of a menace. But are they striking at the tap root or only at a surface root?

I was struck with this: "Old Neill," the father of one of the lines, lived to be 110 years old. He was a chronic drunkard and shiftless but was described by old men as a "harmless fellow and rather decent."

Had he burned a few houses or killed a few men and been hanged therefor he would have been less harmful and more decent than his progeny has proved him.

THE NAM FAMILY

The second memoir issued by the Eugenics Record Office gives the results of a family of ne'er-do-wells that originated, so far as the study showed, in Massachusetts about 1750. Soon after 1800 this family began to inhabit the jails, asylums and poorhouses in a certain rural district in New York. The farmers of this neighborhood have had to bear the expense of caring for the defectives in this large family since about 1830.

A certain portion of them migrated to Minnesota and the investigators followed up those branches with a view to discovering whether the new environment would bring the stock up to standard.

The report quotes an old history as saying of the Nam who started the strain:

"He is one of a set of vagabonds by the name of Nam who lived in the mountains." One of the sons is described as "ignorant, alcoholic, irascible, and indolent."

"One son emigrated to New York, bought 160 acres of land, and there, in 1810, built a log cabin which was occupied until 1880 and is still standing. This log cabin may justly be called 'the Cradle of Nam Hollow,' for everyone born in this cabin has been socially inadequate and has helped to swell the number of degenerates who give this place its character."

The conclusions quoted below are based upon a study of 1,795 individuals of whom 852 were descended from the original Nam. The cost of this family is estimated at $1,411,000.

The non-social traits in this family are indolence, alcoholism and licentiousness.

The eugenic principles of laziness are as follows:

"When both parents are industrious, 90 per cent of the children are industrious; when both parents are indolent, 76.5 per cent of the children are indolent.

"Two lazy parents may become the founders of industrious strains, but indolent strains arise chiefly, if not exclusively, by marriage with indolent persons."

Alcoholism is extraordinarily high—88 per cent. of the females and 90 per cent of the males. "Where both parents were alcoholics every child became alcoholic. Where one parent was alcoholic and the other possessed self-control the offspring who were alcoholics ranged from 50 to 75 per cent."

A study of the cousin marriages in this strain (where the bad predomi-

nated) showed consequences of infant mortality, imbecility, feeble-mindedness and other defects fearful to contemplate.

On the possibilty of improving the strain by improving the environment the authors say:

"Placing out in better families and asylum life give a veneer of culture and tend to strengthen the sex impulses, but that effect is uncertain and frequently discouragingly slight."

As to the effects of the migration to Minnesota one report says:

"The Nams were of the inefficient, worthless sort, not lazy and not criminal. None of them was ever arrested except for drunkenness."

Another report says of the second Minnesota generation:

"They are inefficient and alcoholic."

The general conclusion as to the emigrants is that they have the same mental traits as those that remained in New York State.

Another general conclusion is that it is three times as expensive to maintain the offspring of a degenerate couple as it is to segregate the original pair and maintain them in idleness.

EUGENICS AND ASYLUMS

The insane committed to institutions make up about three-tenths to five-tenths of 1 per cent of the population. Every town having a thousand inhabitants has about four insane who are being cared for by the government. The percentage is increasing continuously.

It is doubtful, however, that there is any increase in insanity. As someone puts it, our standards of sanity are increasing, which means that many people are now regarded as insane who a generation ago would have been regarded as merely peculiar.

Another reason is that the standards of custodial care have advanced until now persons are willingly released to asylums where a generation ago they were kept at home by reason of the inhumanity of many of the provisions for custody.

Asylums were of the first eugenics agencies. By segregating the insane they have always protected the stock, not perfectly but fairly well, as the results show.

The insane in a rough way fall into three groups: The paretic, the dementia precox, and the maniac depressive. As a eugenic measure asylums are quite effective in relation to the first two groups but not as to the third.

Mott in his paper showed that of the children born to insane parents, 8 per cent were born after the first attack of insanity. This maniac depressive group includes the emotional insane—the people who get worse and better, those who come and go in asylums, sometimes being held sane about half the time and insane the other half.

It is from another standpoint that asylums as eugenic agents fail. The border line between sanity and insanity is hazy. Insanity is not inherited. A certain mental instability is inherited and environment pushes those of that group into sanity or insanity. Mott quotes Morel as follows:

"Nervous, irritable weakness, the neurotic temperament, neurasthenic

predisposition may be the first evidence of degeneration of a stock. The signs of degeneracy which may be exhibited are self-centered, narrow mindedness in religious beliefs, fanaticism, mysticism, spiritism, an unwholesome contempt for traditional custom, social usages, and morality, a vain spirit of spurious art and culture, a false self-loving vanity in the pursuit of a sentimental altruism, or by eccentricities of all kinds.

"Such signs of degeneracy are often combined with talent and even genius, but the brilliant intellectual qualities of a degenerate are invariably associated with either a lack of moral sense or of sound judgment and the highest control."

As showing the relation of inheritance to insanity as demonstrated by a study of the provable insane Mott studied the family relationships of the insane in London asylums.

He found 750 closely related persons, about 3.5 per cent of the whole. He is certain that not 3.5 per cent of all the people in London are so closely kin.

He argues that the strains with a large infusion of mental twists produce an undue proportion of the insane.

THE IMMIGRANT'S CHILD

In 1910 the National Immigration Commission issued a study entitled "Changes in the Bodily Form of Descendants of Immigrants." It was issued as Senate Document No. 208.

Are we amalgamating the people who come to us? Is this the "melting pot"? We think we are taking people from all parts of the world and making them Americans. Are we doing this socially, politically, mentally, physically?

The question as to the physical amalgamation was that which this commission set out to solve. It compared children born abroad with children born in this country to immigrant parents. It compared children from mothers who had recently come over and from those who had been over one year, five years, ten years. These different groups were compared with one another and with children born before the mothers emigrated.

Jews principally from Poland and Russia and Italians principally from Sicily and Calabria were studied. Some of the commission's conclusions follow:

The Sicilian type of head is long and narrow. Sicilian babies born in New York within five years after the mother landed have a shorter, broader head and those born later have a still shorter, broader brain box.

The East-European Jew has a round head. Babies born to Jewish mothers in this country have longer, narrower heads than those born abroad.

Comparing the different groups of children—mothers here ten years, five years and two years—it was found that the change of type from children born abroad to the two-year type was rapid; from the two- to five- to ten-year type that the change was slower.

It is the first few years in this country which contrast most with what the mother has been accustomed to and her children show it in their make-up.

The other parts of the body are changing even more strikingly. The

head changes are noted here because the head shape is supposed to be fixed and hard to change.

Thus we see that while inheritance counts environment gradually makes us even—regardless of race, religion or region of origin.

Another interesting conclusion was that while the Jewish child born in this country shows an improved physique as compared with the Jewish child born abroad the physique of American-born Sicilians and Calabrians shows a downward tendency. American city life is helping the children of Jews from eastern Europe. It is harming those of Sicilians and Calabrians.

SMALL FAMILIES

The baby death rate in large families is high. The prospective mother is nearly always run down and frequently is ill nourished. The duty of caring for her child already born, the nourishment which she furnishes it from her own body, the broken rest—when these are added to the strain of childbearing at short intervals—lower the nourishing power of the mother so that the forming baby does not get nourishment enough.

The baby starts out poorly. If to this is added bad environment a high death rate can be expected. The rule is that in families where there are many children the nursing is done by young children, the bedrooms are crowded, cheap milk and inexpensive food other than milk is used, the family income is small—and in many instances the parents know neither the language nor the customs of the country.

The argument of the thinkers and investigators is practically unanimous for small families as against large. This plea is the very backbone of the booklets on race regeneration written by Ellis, Newsholme and Saleeby. Supporting this view are some conclusions of Boas in the report of the Immigration Commission. They say that first born children exceed later born children in stature and weight. Investigations made of the school children of Toronto, Canada, and Oakland, California, showed a decided decrease in development of the individual according to the increasing size of the family.

Havelock Ellis in writing about the decreasing size of families says the decrease starts in the more advanced nations and works down—as it starts in the most intelligent families and gradually invades all levels. It began in highly enlightened, thrifty France, extended to Germany, thence to England, and within a generation or two will reach the nations of eastern Europe.

The immigration commission finds support for this view. For example, those from rural Poland where community life is simple have large families in the first generation; in the second generation their families are nearer the American average and in the third the American level is practically reached.

On the other hand small families are not an unmixed blessing. The Galton laboratory files show a higher tuberculosis, insanity and criminality rate among first borns than among later children. However, these are conditions which develop in adult life and are due to social and economic causes rather than to inheritance.

When a baby's chance of living is small a part of it is due to bad heredity, a part to bad environment, and a part of it is due to the bad condition during

these borderline nine months between the beginning of the child and its birth.

THE ONLY CHILD

In presenting the arguments for small families I would not have you overlook the disadvantages of the only child.

Pearson found that first children, the normal consumption rate being 66, had a rate of 112. The normal criminality rate being 56 they had a rate of 120. They had a lunacy rate which is above the normal. Where the first child is the only child these rates are the family rates.

The only child is usually well shielded against summer complaint, measles, scarlet fever, diphtheria and smallpox. It has more of the mother's care than the child who is one of several and there is some advantage in this but there is more than enough disadvantage to offset.

The limitation of the family to one child, as a rule, is voluntary. This means also, as a rule, that the parents are self-indulgent and weak-spirited —a bad inheritance. The child is indulged, coddled and pampered. He is overhoused, overdressed and of low resistance. He is spindle-legged, thin-chested, anemic and flabby. He is a poor player, is self-centered, nervous, out of sympathy, anti-social. He is neurotic, neurasthenic, "whiny."

There are "only children" to whom none of these criticisms applies. But averaging 1,000 such children these qualities will be found more frequently than among 1,000 children of three-children families.

The hardest problem of life is to find one's self—to get a line on one's self as compared with one's fellows. This the only child finds very difficult. He has been talking with adults instead of having coöperative and competitive play with other children and he has not had a fair chance to find himself.

Grinker, in his paper on "Race Breeding," emphasizes the difficulties of rewards and punishments, of control of emotions and nervous impulses. These are doubly difficult where the child is an only child. To be an only child is awfully hard on the child. If the records show that the child of a large family stands a poor chance I am sure that the only child also stands a poor chance.

Small families are wise—but they should not be too small. A French authority says that the good of the state demands that a family should consist of at least three children. The best family, from the standpoint of the state contains four healthy sound children.

Prenatal Marking.—*Anxious writes: "1. At what time during pregnancy is a fright or scare to the mother liable to affect the child? 2. Is it natural for the breasts to be very sore? 3. Do they remain so the entire period?"*

Reply.—1. At no time. A fright or scare cannot mark an unborn child. When development starts the child is from under the influence of the mother except as to its nutrition. If she is being starved or poisoned the baby will follow suit. If she is well nourished the babe will be. The developing child is liable to be hurt and thus deformity may be brought about. This, however, is due to other developmental principles. Gen-

erally speaking, everything relating to inheritance from mother or father has laid out its work when the child begins to form.

2. Yes, with some women.

3. Somewhat so, but proper care of them reduces the soreness greatly.

No Cause for Worry.—*Mrs. A. writes: "I expect to give birth to a little one in January and have become frightened several times. A great many people tell me I probably have marked my child. I have been brought up to believe that there is nothing in this, that it is an old-fashioned idea, and that it is impossible to mark a baby, as the unborn child is so well protected. I find it impossible to argue with these women, as I am not certain myself. Your kind advice on this subject will be greatly appreciated. Also will you tell me whether an 8-month baby lives?"*

REPLY.—Birthmarks, harelips and other deformities do not result from frights, scares or other violent mental shocks to the mother. This fantastic idea has never had any foundation in fact. Whenever instances have been investigated it has been found that there was no reason for believing that the deformity was due to anything which the mother had seen or heard.

The mental state of mothers, some of the diseases which affect them and their nutrition may affect the growth and nutrition of the child but they cannot cause organs to develop wrongly.

At some time I shall go further into the subject of the influence of the parent on the unborn child.

An eight-month baby has a good chance to live; nearly as good as a nine-month baby.

Cretinism.—*O. B. D. writes: "What is the cause of cretinism? How does it differ from idiocy?"*

REPLY.—Cretins have poorly developed thyroid glands. They are generally feeble-minded; occasionally they are idiotic. Idiots may be such because of insufficient thyroid or by reason of other deficiencies. Not all idiots have poorly developed thyroid glands. In fact, some idiots have a good muscular, bony, and thyroid development. Idiocy is a condition of mind. Cretinism is a condition of the thyroid gland.

Exceptions Not Convincing.—*C. L. R. writes: "The argument as to small families versus large families has another side to it which does not mean precisely what the argument would, at first sight, seem to indicate. I shall first give the argument, or, rather, a few facts, and then point to the real meaning, as distinguished from the apparent meaning. In a surprising number of cases the eminent man has been the youngest, or almost the youngest, child of a large family. Franklin was the fifteenth child; Josiah Wedgwood was the eleventh child; Thomas Young, the tenth child; John Hunter and many others were the ends of large families. If these families had been curtailed to make small families, these eminent men would not have been born; and the list, when extended, includes many hundreds of men who have been of the most use to the world and have contributed most to its progress. Apparently this means that the large family is desirable, but when investigated further it is found that there is something else than mere largeness of family which is desirable. The really eminent persons are nearly all born when their parents are of more than mature age; in fact, when their fathers are comparatively old. But*

on investigating still further it is found that age of itself is not the real thing, any more than mere largeness of family is the real thing. Both are incidental to the production of the real thing, and that real thing is energy accumulated by work performed before reproduction takes place. Age in parents is time, which is always a factor of energy, and the large family is simply the commonest means by which children are produced late in the lives of their parents. An analysis of the few exceptional cases in which eminent men have come from comparatively young parents shows that the process of accumulating energy is one which extends back through generations. As a collateral on this investigation it is found that as long as parents retain their health and strength, the older they are when their children are born, the longer is the normal life of those children. This has a direct bearing on what you are teaching."

REPLY.—Some studies made in Chicago show that the children of immature parents are not healthy and strong. Studies of children born to old parents show them not to be strong. The strongest children are those born to parents in the years of strength. The citation of seeming exceptions is not convincing, because we must stand by averages and also because, as Havelock Ellis has shown, great genius is closely related to mental defects.

Have Effect on Child.—*L. D. P. writes: "A woman at the age of 26 becomes a mother. She has taken laudanum as a preventive against childbirth and is also quite a heavy drinker of whisky. Do these have any effect on the child?"*

REPLY.—Yes.

Marriage of Cousins.—*L. writes: "What do you think about cousins marrying? I am about to take such a step, as I believe there is no harm in it. The family is opposed to it, asserting that such a marriage is hurtful to the next generation. I have among my friends some married cousins and one couple still closer related. All have children, and everything seems all right. Why do royal families intermarry, and such families as the Rothschilds? My father objects most because he and his brother are so much alike in temperament and that I am so much like him, also that I am so nearsighted."*

REPLY.—The marriage of cousins is advisable or not according to the family history. The mental and physical strength of the European aristocracies including royalties can scarcely be held to be a proof of the advantage of intermarrying. All improvements in breeds of domestic animals has been brought about in part by judicious inbreeding. That it has done more good than harm with animals where mating is under the control of dominating minds working with no regard for any consideration except a given end does not argue that it would do more good with the human race whose mating is not thus dominated. Experience shows that with men inbreeding has done more harm than good. If in the blood strains there are dominant good traits those traits will be strengthened in the progeny by the marriage of cousins. If there are bad traits such as insanity, epilepsy, feeble-mindedness, nearsightedness, and the like, those will be made worse. Finally there is a slight deterioration in cousin-mating which is like the gambler's 15 per cent—though it may be overcome temporarily, if persisted in, it finally comes to the front.

Law Forbids Marriage.—*P. L. writes: "If you will kindly write a paragraph or more on the inadvisability of the marriage of first cousins, it will be greatly appreciated. A young friend—male—is corresponding with a first cousin, and I wish some authoritative statements to put before them."*

REPLY.—The marriage of first cousins is prohibited by the laws of Illinois and some other states. Except in selected cases, the marriage of first cousins is bad for the offspring. Any defect in the stock is especially apt to crop out in the children of such marriages.

If a careful search shows the stock exceptionally free from inheritable defects marriage of first cousins is not bad for the stock.

The rule, then, should be that first cousins should not marry. But those passed by some such authority as the staff of Eugenics Laboratory should be allowed to marry.

Size of Family.—*S. A. B. writes: "I had hoped that your article on 'Small Families' would state what all writers on this subject seem to have overlooked or ignored: That there is a distinction between death rate and death percentage. It is no scientific discovery that the death rate in big families is greater than the death rate in small families. It could not be otherwise. Where a larger number of children are born and consequently exposed to sickness and death, there are bound to be more deaths. But it does not necessarily follow that the percentage of deaths in the big family is greater than in the small family. If the large family is given decent social and industrial conditions under which to live and grow—a natural right that society is now denying them—it is my opinion that there will be among the children of large families a greater percentage of survivals than among the children of small families, a conclusion justified by statistics, which seem to indicate that the physical condition of 50 per cent of the male portion of the population of marriageable age is not* comme il faut; *and this approximately 50 per cent includes, I believe, only a small portion of the so-called poorer class, saved from inclusion not on account of any superior sense of morality but rather by virtue of proneness to early marriage and their conspicuous fecundity. Is it not a fact that, for the big death rate among the children of the poor, society, and not the existence of a large family, is to blame? The large family cannot be considered an evil* per se. *Society, however, is at fault, when it makes the raising of a large family a hardship to worthy parents, and almost an impossibility to the poor. The remedy, if remedy is needed, lies not in the reduction of the size of a family but in the increase in the earnings of the members of the family."*

REPLY.—Conclusions as to the advantage and disadvantage of families of different sizes are based on:

A. Mortality among the children.

B. The prevalence of different diseases among children of small and large families.

C. Measurements of children at a given age.

D. The percentage of abnormally dull children in the different groups.

Conclusions drawn from infant mortality alone, as you show, would be misleading. The conclusions generally favor three or four children, or more, if the intervals between them are long. If you will look into the matter you will find that infant mortality is generally figured on the basis of total infant population.

Eugenics.—*J. W. B. writes: "I have heard mentioned several times lately a new science coming into vogue called eugenics. What is it and where can I read up on it?"*

REPLY.—Eugenics is the science having to do with the improvement of the race through heredity. By negative eugenics is meant measures for the prevention of reproduction by those whose children would certainly be burdens on the community. By positive eugenics is meant all of those measures that make for improvement in inheritance. Go to any library or to any book store and ask to see the catalog of books and magazines on eugenics.

Birthmarks.— *L. H. P. writes: "If you do not believe a mother can mark her child, how do you account for these cases, which I know to be true? A neighbor's boy in leading a cow with a rope had one of his fingers cut off between the rope and a tree. His mother saw the accident, and when her baby was born it was minus the same finger on the same hand.*

"My wife's aunt in going by some currant bushes reached through the fence and picked some. A woman came out and shouted at her to stop. In trying to get her hand out it caught between the pickets and she was obliged to drop the currants. When her baby was born it had a perfect bunch of currants on its arm in the same place where the mother's arm was caught in the fence. This birthmark turns a bright red when currants are ripe. At other times it is faint.

"My mother had a servant with red hair that made her a lot of trouble. When my mother's baby was born he had red hair, and during his life was a constant worry to my mother. No other red hair in the family that I ever heard of. My mother's hair was black and my father's a dark brown. I know of similar cases."

REPLY.—You have not set forth all of the facts although you probably stated all known to you. For example: How much red was there in your father's dark brown hair? How about your grandparents? Your great-grandparents? No one of the phenomena related could possibly be the result of maternal impression.

Question of Physical Condition.—*J. P. writes: "In a recent discussion on the feasibility of first cousins marrying I found that it was considered impracticable by most people present. Would the offspring be affected if the physical condition of the parents was perfect? Under what conditions could cousins marry without ill effect upon their children? Perhaps you would rather refer me to some eugenics society or literature published on the subject. I should like full information."*

REPLY.—1. In order to decide whether first cousins should marry it is necessary to find out, first, if the individuals are free from inheritable conditions and, second, if the stock as far back as the great-grandparents is free. If so, there is no reason why they should not marry if they live in a state where the marriage of first cousins is allowed.

2. Write the Eugenics Laboratory, Cold Spring Harbor, L. I., New York, for their blanks. Fill them out and return them with a request for counsel.

No Bar to Marriage.—*G. G. A. writes to ask about a marriage to be. The young man is of average height, slender, healthy color, lives a clean, temperate life, is full of energy and ambition and has a great love for*

work. He is 30 years of age. The woman is about 5 feet 7, well developed, has never been seriously ill in her life but is not the husky type. She is eighteen months older than the man in question. Of late she has heard a great deal about the kind of people one should marry to insure healthy children. She is imbued with the idea because of something she has read that she has no right to marry a man so entirely her opposite physically and eighteen months younger than she. Also the fact that she is of German parentage and he of a mixture of Welsh and Irish troubles her.

REPLY.—There is no reason why they should not marry. The difference in age, the difference in nationality and what you write of the difference in their physiques are in no sense a bar.

Marriage of Cousins.—*D. L. D. writes that she is engaged to marry her cousin. He seems fond of her and she of him but she is doubtful and wants to know what she shall do about it.*

REPLY.—I cannot answer your question without knowing more of the facts. There are certain blood strains that are made stronger by intermarriage of members of the strain. There are certain conditions and diseases which appear with more frequency and in worse forms in the strain as a result of intermarriage. In addition to these last there are a few conditions which tend to develop in the children of intermarriages, even though there is no taint in the stock. I should suggest that you write to Professor Davenport, Eugenics Laboratory, Cold Spring Harbor, New York, giving your family history and that of your affianced, what diseases they have had, what they have died of, the family traits—and ask his advice.

Second Cousins May Marry.—*J. G. writes: "Is there any danger in the marriage of second cousins? Would their children be all right?"*

REPLY.—No. There are some families where the stock is so bad that not even second cousins belonging to them should marry but such families are few.

Intermarriage.—*W. B. writes: "Is it a fact that intermarriage is detrimental to the offspring?"*

REPLY.—Intermarriage may or may not be detrimental to the offspring. Every improved breed of stock has been inbred. Individuals with points desirable in the offspring are inbred until those qualities are fixed. A time comes, however, when outbreeding is necessary to save the stock. On the other hand it has been proved that intermarriage brings about imbecility, nervous instability, and a long train of undesirable conditions. Mendelism teaches under what circumstances intermarriage is helpful and under what detrimental to the offspring. Even when it is gainful it becomes harmful if persisted in for more than two or three generations. If a stock has strength in it, intermarriage fixes it in the strain. If it has insane or epileptics or cretins or a number of other undesirables in it intermarriage fixes those qualities in the strain.

Blindness Not Inheritable.—*Mrs. O. B. writes: "A few days ago a lady wrote the* Tribune *opposing the bill now before the legislature for a colony for the blind. In this letter the lady said children born to the blind will be blind. Is this correct?"*

REPLY.—No. The children of the blind are not especially liable to be blind. The most frequent cause of blindness is infection of the eyes. Another group of causes is the general or systemic infections which affect the eyes secondarily. The next most important cause is accidents and injuries. Into these three groups fall nearly all cases of blindness. Such are not inherited and not inheritable.

Weismann tried out this question thoroughly. He cut off the tails of mice and bred the tailless individuals. He kept this up for thirty generations and found that no mouse was born tailless.

Blindness, the result of infection or accident, is on a par, from the inheritance standpoint, with the Weismann bobtailed mice. The idea that blindness is inherited is due to the number of blind babies. The infection of the eyes which results in blindness is very apt to take place during birth or shortly thereafter.

Such Marriage Forbidden.—*J. H. W. writes: "1. Is it lawful for a girl to marry her uncle? 2. What do you think of a marriage of this kind?"*

REPLY.—1. No.

2. Such a marriage should not be allowed. If there is insanity, feeblemindedness or viciousness in the stock it is apt to crop out in the progeny of such a union. As in times past no particular effort has been made to keep stocks pure or even to know what stocks are pure there is no way of telling when such unions would be safe. In fact, such unions are practically never safe.

Marriage of Double Relations.—*H. writes: "Would you kindly tell me whether there is any danger of weakness in the children born of a couple who are cousins? The girl I wish to marry is doubly related to me. She is a cousin to me on my father's side and a second cousin on my mother's side. Both her health and mine have been nothing but the best since our birth. We have never been subject to any sickness, except the measles. I am strong. Our morals are of the highest standard. Our ancestors, as far as we can trace them, over 200 years, have been people of strong and healthy mind and body and have been long lived. As far as we know, none of our ancestors ever died of any disease, but succumbed to old age, most of them having attained 65 to 90 years. Do you think that there is danger that the children who may be born to us will be weak mentally or physically in any way?"*

REPLY.—There are states in which you could marry. In the family history submitted there is nothing noted that should prevent your marrying. You are so closely kin that you had better search your family history for inheritable bad traits and conditions. It is not enough that you and your intended are free. Go back three generations. Write to the Eugenics Laboratory, Cold Spring Harbor, New York, for blanks. Fill these out and return to the laboratory.

Should Cousins Wed?—*G. A. writes that he is anxious to marry his first cousin. So far as can be learned her ancestors have never intermarried. Good health is the rule. In fact, both cousins are of sturdy stock.*

REPLY.—Irving Fisher says that by prohibiting improper marriages ancient Sparta raised its vitality to a high point of physical excellence. In twenty states marriage of first cousins is illegal. Arner's "Consanguineous

Marriage in the United States" discusses the subject excellently, according to Fisher.

In a family tree there can be a few intermarriages without deteriorating the stock. In fact, experimenters in Mendelism and expert breeders of stock and plants habitually cause inbreeding as a means of fixing a type. Where a prospective parent has an especially good point it can be emphasized by inbreeding in the offspring. But scientific breeders recognize that while they are strengthening one quality they are weakening the substratum, and inbreeding, persisted in, undermines the whole structure.

The conclusion, which we believe justified, is that while inbreeding in beasts controlled as it is by practical scientists is justified, inbreeding in the human species where mating is the result of sentiment and impulse is subjecting posterity to risks which are not justified.

Mendel Theory of Eugenics.—*A. W. S. writes: "1. Please explain the Mendel theory of eugenics. 2. What countries or states, if any, have passed or are seriously agitating a eugenics law?"*

REPLY.—1. The Mendel theory of inheritance relates both to good breeding or eugenics, and to bad breeding. The Mendel theory is too long to be given as an answer. To understand it get Castle's book or Drinkwater's booklet.

2. In one way or another the subject is covered.

Eugenics Literature.—*C. O. J. writes: "Please give me a list of the books and pamphlets mentioned in your first lectures on eugenics at the Y. M. C. A. Any other important literature on hygiene and eugenics you would like to recommend will be appreciated."*

REPLY.—"Heredity in Relation to Eugenics," Davenport; "Studies from the Eugenics Laboratory, Cold Spring Harbor, N. Y."; "Problems in Eugenics," from the Eugenics Laboratory, Cold Spring Harbor, N. Y.; "Heredity and Eugenics," Castle and others; "Race Regeneration" series; "Heredity," Castle; "Eugenics Review," Eugenics Education Society; "The Super Race," Nearing; "The Task of Social Hygiene," Ellis.

Risk Four Cents.—*A. B. writes: "In a recent answer to questioners you said: 'Write to the Eugenics Laboratory, Cold Spring Harbor, N. Y., for blanks. Fill these out and return to the laboratory.' Am I to understand from this that anyone can thus secure aid in looking up ancestors? Is it done free of charge for anyone?"*

REPLY.—In looking up ancestors, no. In safeguarding descendants, yes within reasonable limits. Risk 4 cents in postage in finding out just what they will do for you.

Advice on Eugenics.—*K. K. writes: "At what institution can one find out as to whether he or she is fitted mentally to marry?"*

REPLY.—Eugenics Laboratory, Cold Spring Harbor, Long Island, N. Y.

Book on Eugenics.—*Inquirer writes: "What book would you recommend on eugenics (from a physical standpoint)? Where can it be procured? Can Slemons' 'Prospective Mother' be bought in any large book store?"*

REPLY.—Davenport's "Heredity in Relation to Eugenics." Your bookseller probably will not have Slemons in stock. He can call up his jobber by telephone and get Slemons and Davenport.

Mentality of Twins.—*R. A. B. writes: "I read an article some time since on the effect the health or the mind of one twin has on the other twin. For example, if one were happy, the other, though miles away, would be likewise, or vice versa. If this is true, what effect would the mind of a twin who has been made feeble-minded by an overdose of a drug have upon the other twin? Or is the article I read all nonsense?"*

Reply.—It is nonsense. Twins are liable to be of the same general type of mind, and, therefore, are disposed to be alike in taking things seriously or lightly or in some other general quality. However, there are many exceptions. Two ova from the same mother stimulated by two cells from the same father, the two cells resulting in two children developing simultaneously, are liable to result in children much alike mentally. According to Mendel's teaching the children may be very dissimilar mentally. Why not get a copy of the report on the "Heredity of Feeble-mindedness" from the Eugenics Laboratory, Cold Spring Harbor, Long Island, N. Y.? It sells for 4 cents.

Reason for Birthmarks.—*S. K. writes: "1. If birthmarks are not caused by impressions of the mother, what is the cause? 2. Why is ergot given in postpartum cases to prevent hemorrhage? I cannot understand how the same drug is used in almost opposite ways. 3. Are there any particular reasons why a person who has nightmare should not marry? Could such a thing be hereditary?"*

Reply.—1. Birthmarks are of so many different kinds that it would take a good many columns to refer to each. Each has its reason for being. I can discuss but one in the limits of this reply—strawberry marks. The area just below the skin is rich in blood vessels. When, in a given patch, the blood vessels are larger than in the surrounding skin, the area shows as a strawberry mark. As the child develops the size of the vessels in the skin is large as compared with their size after the skin upbuilding has come to a rest. The need for blood in the skin, the size of the blood vessels, lessens relatively. In a strawberry area this diminution does not take place. Nature leaves a bit of scaffold behind. The reason may be a local injury or hurt or infection. The mind of the mother is not hooked up in any way with the capillaries in the skin of the baby.

2. Ergot contracts smooth or involuntary muscle fibers. The blood vessels contain such fibers—therefore ergot contracts them, makes them smaller, stops hemorrhage. The uterus is composed of smooth or involuntary muscle. Ergot stimulates this muscle to contract. The contracting muscle squeezes the blood vessels and collapses them. This action is of importance in stopping uterine hemorrhage. It is pretty well agreed that ergot is just about powerless to bring about abortion.

3. No, but if the supposed nightmare is really epilepsy the person should not marry.

Fright and Birthmarks.—*L. writes: "I must take issue with you on the question of birthmarks. I know of a young wife who was called on by a one-armed fish peddler. Without thought he thrust the stump of his arm almost into her face. It gave her a shock. A few months later she gave birth to a fine girl baby with no hand on one of the arms. It was as if the hand had been amputated. I have imagined that your positive stand regarding birthmarks might be taken in order to free expectant mothers*

from apprehension. I did not think it could represent your actual opinion in the matter."

REPLY.—After the first third of pregnancy is passed the arm of the developing child is just as definitely developed as it is in an adult. It would be just as easy for a woman to think her own hand off as to think off the hand of her baby. The cord got caught around the hand and strangled it off or the child was injured in the arm region while carried by the mother. Why go snooping around looking for mystery in connection with a case like this since when the facts are known the explanation of them is as simple as the ringing of a bell when the button is pushed?

Deafmutism Inheritable.—*B. L. D. writes: "Kindly enlighten me as to why, as a rule, as far as my observations have been, the children of married first cousins are born deaf and dumb? Is it due to some physical cause through the mating of first cousins?"*

REPLY.—Deafmutism is inheritable. Intermarriage where there is mutism in the stock is liable to result in a certain proportion of the children being deaf-mutes. By "in the stock" is meant all the descendants of one's great-grandparents. Back of that is not of much consequence. Deafness coming on after middle life is in a smaller degree an inheritable quality.

The Volta Bureau, Thirty-fifth and Volta Place, Washington, D. C., would be glad to have an accurate statement of the inheritance phenomena of deafmutism noted by you. Davenport's book gives the laws of inheritance of deafmutism.

Eugenics No Fad.—*I. writes: "Is this talk of eugenics merely a fad, or is it something which is really sane, serious, and necessary? Where does one secure the certificates for a eugenic marriage?"*

REPLY.—No, eugenics is not a fad. It is sane, serious and necessary. The marriage laws differ in different states. The Wisconsin law, commonly referred to as a eugenics law, has just been upheld by the Supreme Court of that state.

It will be some time before it will be certain just what should be the requirements of a eugenic marriage. Let me suggest that you get a copy of the blank required in Wisconsin and have any reputable physician examine you as required by that blank.

Books on Eugenics.—*N. A. W. writes: "Where can I secure a copy of Davenport's 'Eugenics, Twelve University Lectures,' or other writings relating to marriage? Can a person obtain any information by addressing the Eugenics Record, Cold Spring Harbor, N. Y.? What is meant by gonococcal infection?"*

REPLY.—1. Your bookseller will get them for you. "Twelve University Lectures" is published by Dodd, Mead & Co.; "Heredity in Relation to Eugenics," by Davenport, is published by Henry Holt & Co.

2. Yes. If you want to know about marriage it will send you blanks to fill in.

3. Infection with gonococcus, the germ which ordinarily causes gonorrhea.

CHAPTER LV

Massage

MASSAGE A CURATIVE AID

Hospitals and dispensaries usually stop when they do as much as medical care and nursing can accomplish. The rule is to carry the patient to the point where convalescence is established and then to dump him out of his bed to make room for another case. Incidentally he must work his way back to a condition to earn his living the best he can.

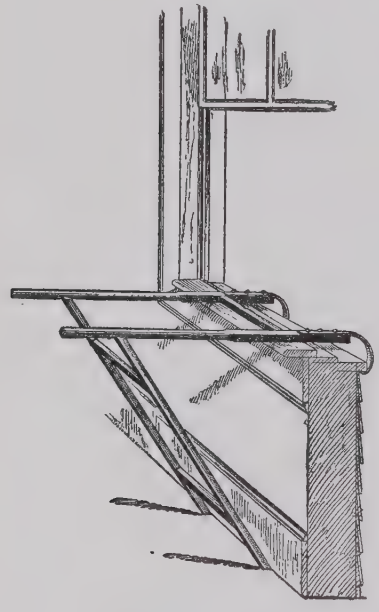


FIG. 414.—EXERCISE BARS TO BE ATTACHED TO WINDOW.

Usually he succeeds admirably and then everybody is happy. Sometimes there is nowhere any reserve to carry him back to strength and then he drifts back to the hospital or to something worse.

A few years ago a New Englander, a crusader born and bred, Cabot by name, began to preach the gospel of a broader care of the sick. According to his doctrine to care for a man sick of disease was not enough. The man must be taken into account before the disease and then the man left by the disease must be cared for and trained back into efficiency. The cure was not completed until the man's muscles were hard, his wind good and his physical machine pulling together. This required the services of physicians, nurses, social workers, masseurs and physical trainers. He succeeded in getting the Massachusetts General Hospital to put most of the plan in operation. Since then most of the better regulated hospitals have felt the influence of Cabot.

About three years ago a Jewish hospital in New York City fitted its dispensary to give massage, mechanotherapy and muscle exercise to patients referred to it from other departments of the hospital. One of the fields which it has worked on especially is to cure up fracture cases so that they could work efficiently.

In the old days it was the custom to amputate badly broken, badly torn or badly infected limbs. One-limbed people were plentiful.

The practice was bad but treatment was so poor that it was better to lose one's limb than to lose one's life.

Now treatment is so much better that in spite of the greatly increased hazards of our heavy machinery one-limbed people among the younger men are rarely seen. Every year will see the number grow less.

A few years ago our methods of handling fractures were so crude that if we could get the bones to knit together everybody was satisfied. If the limb was somewhat crooked or if the adjacent joints were a little stiff it was thought to be inevitable. Ofttimes we had to be satisfied with a false joint—the bones would not knit.

Now a failure to knit is inexcusable except where the fracture is of the hip within the capsule.

The next step will be for the surgeons to operate promptly on those hip fractures (intra-capsular), nailing the fragments together. When such fractures are treated by operation the day of old ununited intracapsular fractures will be over.

Fig. 415.—Door Exercising Bar.

So far as the other fractures are concerned they are now expected to heal in such a way as to leave the limb strong and the joints just as pliable as before.

To bring about this last result several procedures have contributed. The first is the use of the X-ray. When a bone is thought to be broken the X-rays

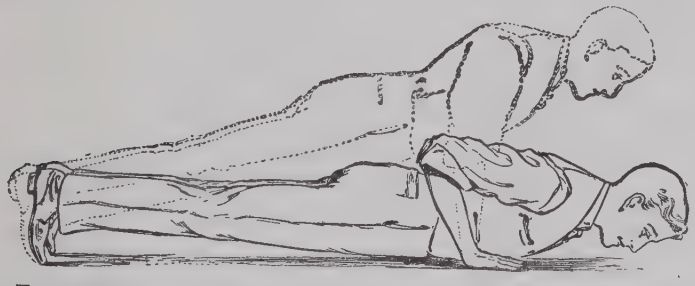


Fig. 416.—Exercise for all Muscles, Especially for Leg and Shoulder Muscles.

show the location and the nature of the break. When the fracture is reduced so that everything is in the right place and no tendons or nerves are caught between the fractured ends are not guessed at but are demonstrated with X-rays. Then, when, during the course of the recovery, it is thought necessary the X-rays show just how things are.

The next procedure that is contributing to the better result is the use of massage and exercise of the limb. Mr. Rumely tells us of two men with broken legs whom he saw treated in a German hospital. One, a professional

man, was told that he could have his leg put up in an ambulatory splint and that he could come and go as he pleased. He could get the advantage of sun, air and exercise.

The other was insured under the government insurance. He would have none of the ambulatory splint. He was entitled to his month of rest in bed and he would have it. He never had heard of a man with a broken leg walking around the street. The man who had more care and what he regarded as better treatment got the worse result.

Thirty years ago a Frenchman, Champonnière, said he thought broken bones should be massaged from the beginning but the idea was too radical for that day and, besides, it was quite risky before the days of X-rays.

One department of the Mount Sinai Hospital gives massage just as soon as it seems good judgment. The nearer the fracture is to a joint the quicker it must be begun, because a stiff joint following a fracture is no longer held allowable. Those stiff jointed people are always at a disadvantage and must not be tolerated among this race so near to the super-race.

A frequent fracture is Colles' fracture, a fracture of both bones of the forearm just above the wrist, the fracture one gets in cranking an automobile or falling on the ice.

When these fractures were put up in splints and massage started in the first week it was found that the arm was cured in twelve to twenty days. When massage was begun in the second week cure took three or four weeks.

When massage was begun in the third and fourth week cure took six weeks. When the massage was postponed longer than four weeks the cure took six to twelve weeks and longer.

In fractures through the elbow the same general results held true. If the massage was begun before the week was out the cure was effected in three to four weeks.

In the case of fracture of a long bone as, for instance, the thigh bone, inches away from a joint, it is safe to hold the bone steady for two weeks before beginning massage.

The massage indicated is a gentle rubbing pressure. The part to be massaged is to be well greased with vaselin, steadied with one hand and the pressure gently applied with the other.

Wolf in his report advises us to be guided by pain. Do not cause pain; for if you cause no pain you can be certain that no harm is being done.

Not only should the effort be to prevent the joint from becoming stiff but the muscles must not be allowed to shrink.

Therefore, toward the end of the treatment, say after the third week, the massage may be of the kind ordinarily called massage. Instead of a gentle rubbing of the skin it may be the usual pinching and digging effort to stimulate nutrition in the muscles.

However fractures cause but a small part of the crippling one sees. There are joints stiffened and gnarled by rheumatism, gout, rheumatoid arthritis, and by gonococcal infections.

There are also flabby and weakened muscles. They may result from infantile paralysis, locomotor ataxia and other forms of paralysis and disuse. These conditions distort the human machinery, getting it out of balance.

"I am all crippled up with rheumatism," is an expression as familiar as

a household word. Why are you so? The reason is to be found usually in the fact that you have not completed the treatment.

A man comes down with rheumatism; he sends for a physician; the physician prescribes for him and he gets better. His pain subsides and he goes back to work.

That is not enough. The use of the salicylates will relieve the pain all right; they make work more bearable; they may limit the damage which the infection otherwise would have done but they do not effect a cure.

FIG. 417.—EXERCISE FOR ALL MUSCLES, ESPECIALLY FOR MUSCLES OF ABDOMINAL WALL.

In acute rheumatism the joint is infected. The germ which causes the rheumatism gets into the blood stream through some part of the body such as the tonsils.

In the treatment of the disease, then, regard should be had not only for the relief of pain but for finding the port of entry of the germ which causes it and putting and keeping it in order.

Rheumatism, though, does more than cause pain. Being an infection it may be of sufficient degree to cause the bones of the joint to grow together resulting in stiffness. If it does not reach this degree of damage it causes injury to delicate and important structures of the joint.

As the result of the injury there may be a creaking, popping sound besides more or less pain when using the joint in after years.

Treatment of rheumatism then should have in view not only relief of pain and the control of the gateway of infection but the correction of damage done to structures that have suffered from the rheumatic attack.

This can be done in two ways: by treatment directed to the care of the joints proper and by treatment having regard for the care and protection of the soft parts involved such as muscles and the various organs of the body—heart, kidneys, and the like.

For the relief of the pain of rheumatism the salicylates and vaccine

are our chief remedies. Vaccines have approached perfection so closely that they are being used quite generally at the present time.

A much more important phase of the treatment of rheumatism consists of efforts looking to the prevention of stiffness of the joints, or, if stiffness has occurred, looking to the correction of it. This can be largely done by massage and exercise.

People who have stiff joints resulting from rheumatism and arthritis should be encouraged to practice passive use until they can be brought into

Fig. 418.—Mild Exercise for Trunk and Leg Muscles.

active service. Massage greatly helps to restore functions and hasten absorption and elimination of diseased products which have been left in the wake of rheumatism. It not only does this but it gives tone to the muscles, thereby creating a more normal balance between the joints and muscles and insuring a more harmonious working of the human machine.

Where it is desired to employ exercise for the restoration of the function of an arm, a hand or a limb a well defined plan of exercise procedure should be followed. The exercise treatment of one extremity or joint does not materially differ from that to be employed in treating another.

For this reason when a plan or system of exercises has been worked out and carefully followed for a short time it becomes less irksome to execute each succeeding time.

When doing exercise one should do his best to accomplish something. Each succeeding attempt should have in view the accomplishment of just a little more good.

Where a hand or wrist, for instance, is crippled as the result of arthritis effort should be made each day to make it a little more useful. Try to move each finger just a trifle more each day. Use gripping exercises and note the increased strength and mobility.

In the beginning these efforts will present many discouragements but by persistent application and effort better use of the part affected will be your ultimate reward.

Since the germ theory of the cause of rheumatism and arthritis has been

advanced many people have got the notion that mineral springs have lost their usefulness in the treatment of this disease.

This is not so. *Mineral springs are most valuable auxiliaries in the treatment, especially in the chronic stage. Nothing more greatly assists in ridding the body of poisons and increasing its resistance.*

In locomotor ataxia, where the muscles have become flabby and weakened from lack of nourishment and disuse, much good has resulted from the systematic employment of massage and scientifically planned exercise in efforts to restore muscular function.

By this means muscles that have been wasting away have been made strong and brought under such control of the mind that it is difficult to identify those afflicted with this disease.

In other words where formerly the sufferer acted automatically he now acts mechanically but on account of his persistent training he has been able to establish a walking gait and such control over his arm movements that it is difficult to distinguish him from the normal.

What has been done for a man suffering from locomotor ataxia can also be done for those suffering from rheumatism and a tendency to arthritis if the treatment is begun early enough. Even where the deformities are pronounced and no efforts at correction have been made for a period of years, one is not justified in a lack of effort at correction along the lines outlined.

CHAPTER LVI

Exercise

Professor Schock of Munich tells us that we must exercise on all fours. We are descended from four-footed animals. Our veins, our stomachs, and various other organs have not fully adjusted themselves to the upright posture. Therefore, back to the four-footed at least for an hour or two each day. Be it curvature of the spine or stomach trouble or biliousness—back to the four-footed.

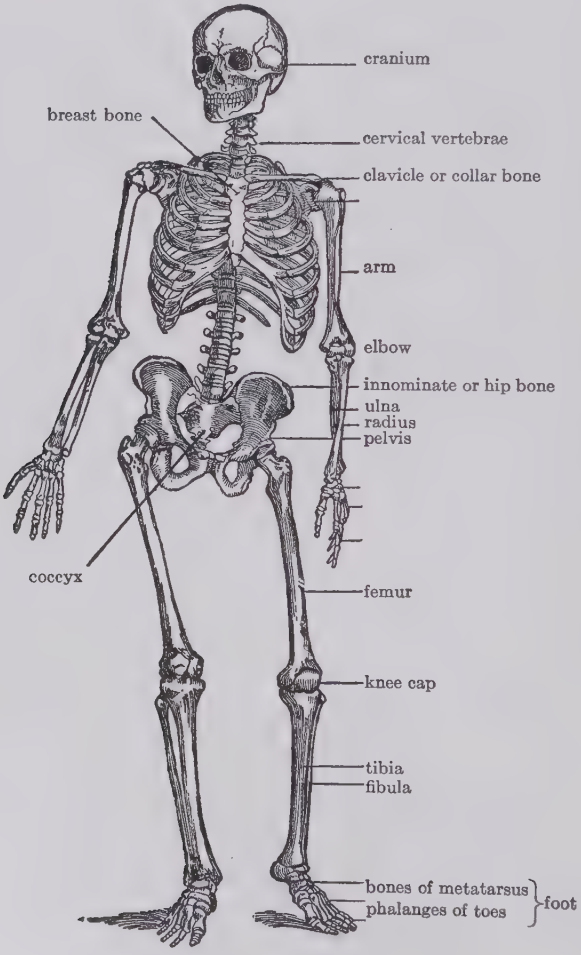


Fig. 419.—The Skeleton.

The advice may be good under rare circumstances. Some lazy, lolling folks will be improved by anything that takes them out of easy chairs. Generally speaking, the plan will do more harm than good. Why?

Much the most bendable part of the spinal column, except the neck, is that in the small of the back—the lumbar region. The little cartilages between the vertebrae permit of a good deal of sway. Whenever the lumbar part of the column sways forward the dorsal or chest part of the column arches back. Increase the forward curve of the abdomen and there always follows some increase in the backward curve of the chest. When this is bad it is called humpback.

Fig. 420.—Upper Surface of Left Clavicle or Collar Bone.

But the trouble does not stop with the back. As the chest column arches back the ribs shape the chest narrow and deep. Whereupon the shoulders slide forward—the condition is stoop shoulders. The shoulder blades flare out—winged scapula. The forward gliding shoulders make the chest cave in in front—hollow chest. These conditions make for consumption, anemia, and low vitality.

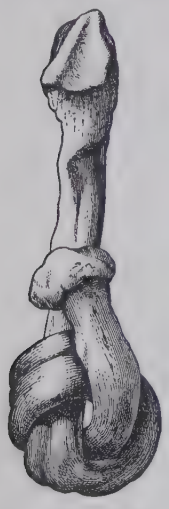


Fig. 421.—Fibula, Lower Leg, Tied in a Knot, After Maceration in a Dilute Acid. From a specimen preserved in spirit. (Dalton.)

Dr. Wiener of Chicago pursues a plan just the opposite of that of Schock. He makes his subjects lie on their abdomens on a hard surface. He then makes violent traction on the head backward and on the shoulders backward, at the same time pressing hard on the back of the spinal column in the chest region. Thus he lessens the chest curve and at the same time indirectly he straightens the lumbar curve. The ribs flatten out.

Woods Hutchinson and M. G. McHugh found out a long time ago that consumptives had narrow chests. These Wiener movements broaden the chest, throw the shoulder blades back, move the shoulders around back of the vertical line and banish the hollows above and below the collar bone. In time the chest takes on a shape midway between the hollow chest and the bantam type.

Other exercises consist in lying on the back and bending the head back over the edge of the table and carrying the arms over the edge of the narrow table. The idea is to throw the chest up by dragging the arms down.

Another exercise consists in having the patient lie with the face down on the table but with all the upper part of the body projecting over the end of the table. The operator supports the patient by the arms. The arms are drawn up as far as possible and the head is bent as far as possible toward the floor.

The purpose of these various exercises is to straighten the spinal curves, to slide the shoulders back and to eliminate the hollows about the collar bone.

The man who spends his days at sedentary work accumulates fat in some inconvenient localities, converts his muscles into structures of low efficiency and loses his wind. While he is better off for the day's work with poor muscles than with good ones he should keep them as high as a certain base line.

There is no reason in having a big-muscled man do brain work or in a

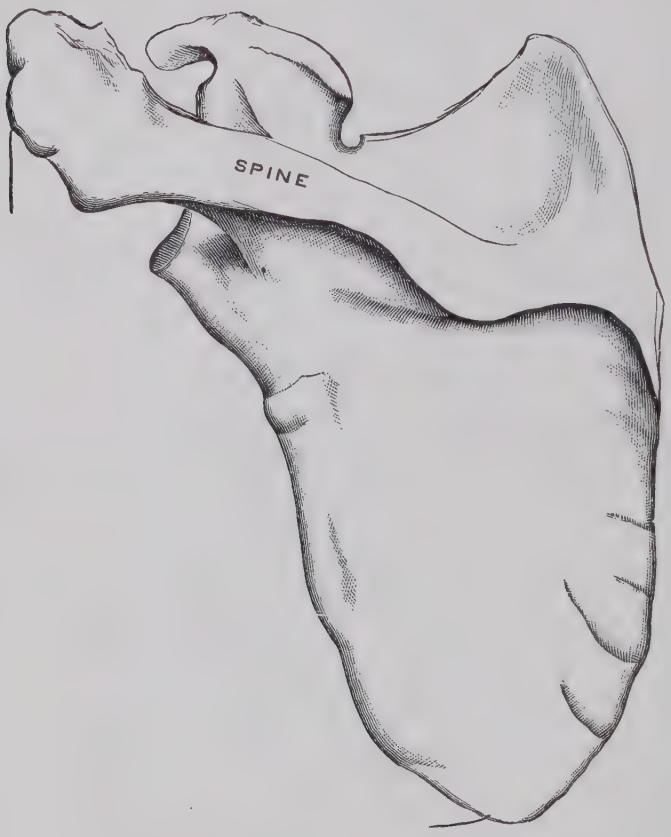


FIG. 422.—LEFT SCAPULA, OR SHOULDER BLADE.

brain working man having monster muscles. Such a combination is a waste, and eventually harms the person in whom the combination exists.

On the other hand a man who keeps himself physically fit gains in efficiency and in his ability to fight disease.

A walk for a mile or more in the morning and again in the evening, kept up for a few weeks, will put the average person in pretty good shape. Begin the exercise with a small dose and gradually increase it. The exercise should be active enough to fill the skin vessels with blood and to bring about a profuse perspiration. The perspiration of itself does no good.

Sweat carries off practically none of the body waste. It is composed of

water and salt and little besides. The common idea about sweating out poisons has very little of truth in it. But to fill the vessels of the skin with blood does wash the waste out of the tissues back to those internal organs capable of burning them up. That's where the good comes in.

The amount of exercise taken should be so gradually increased that no stiffness and soreness is produced. Bear this in mind: stiffness and soreness are signs that mean the thing has been overdosed. In time an ordinary dose of overdoing will be recovered from, at least so far as the pain and soreness is concerned, but a record of it is made on the arteries.

If overdoing is persisted in, it may finally end up in arteriosclerosis, high blood pressure or some other disease of the worn out group. Some people will find it better to train for the vacation by swimming once or twice each day, others by climbing stairs.

If one's office is on the fourteenth floor let him get off at the tenth floor and walk up. In the afternoon let him walk down to the tenth floor and take the elevator there. Two days later let him make the eighth floor the end of his ride and so on until he climbs the fourteen flights without panting or soreness coming after. Whatever method is the most convenient let him follow it until he has some wind. When he lands at the resort chosen the impulse will be to try every stunt the first day.

The gypsy in him is calling. The memories of his youth in the woods and fields, the recollections of the old swimming hole, of fishing in the creek, of hunting with the old muzzle loader; all these are calling. Resentment at days spent cooped up, jailed—this is driving. The man feels an almost irresistible impulse to do it all at once. He overdoes. In consequence he is again cooped up with stiff joints, sore muscles, aching feet, or sunburnt back—days are lost.

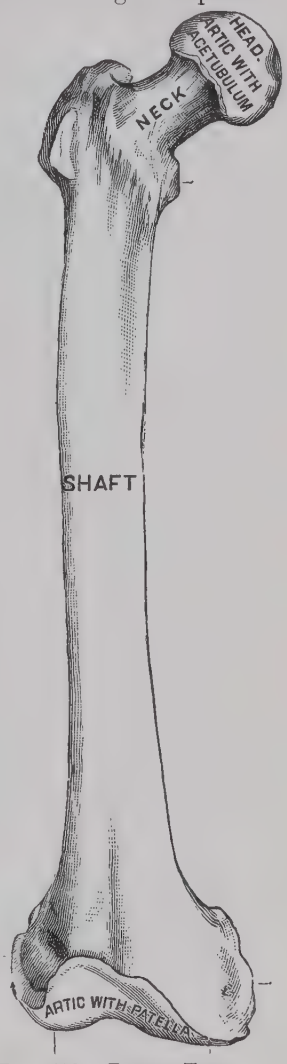


FIG. 423.—RIGHT FEMUR, OR THIGH BONE.

LEARN HOW TO WALK

Physiological laboratories and even the well organized boards of education equip themselves with an instrument called an ergograph. This little instrument accurately records the power and rhythm of muscle movements. Making use of it, we have learned many things about muscles that the ath-

letes had suggested in a crude, dogmatic way as the result of their experiences.

We know much about fatigue, its causes, its effects, the differences in the rate of its development according as muscles work within easy limits or under some stress. I have never seen any ergograph testing of the leg and foot muscles to discover the extra strain of "walking wrong" as compared with "walking right." But there is a lot of curbstone opinion that the man who "walks wrong" may "get there just the same" but he is more tired than the other fellow when he does. I am sure the ergograph would confirm this curbstone opinion.

The ankle joint can only move backwards and forwards. The little lateral play in the foot is between the bones of the foot itself. The muscles of the leg, upper and lower, are so placed as to move the foot forward or back—toward the toes or toward the heels. When in walking the foot is carried forward, slewed out, the muscles waste some of their power pulling against their tendon sheaths. *From the mechanical standpoint, the toes should point straight forward or a little in—a very little pigeon toe is a good arrangement.*

When the body is still plastic it is good judgment to spend some effort in learning how to walk rightly. Why should the mother stop her teaching when the baby learns to walk? Most children under the school age point their feet about right. The turning to one side or the other is noticeable in the mid-school years.

Possibly the knee breeches age shows up a degree of deformity which may pass unnoticed when the clothes are worn longer. If this is true the trouble may be progressive from shoe time on. At any rate, in those years the body is changing so much that with proper care a tendency to toe out or toe in can be corrected.

Under efforts made to correct the bones will shape themselves just a wee bit differently, the tendon sheaths will move a fraction of an inch forward or back, the muscles will change their location a bit, the body will readjust its automatic balancing apparatus a little differently; whereupon the leg muscles will be able to work at higher efficiency and with less tire.

The first step in the training to cure toeing out will be to teach the child to stand with the heels apart. When standing in this way the toes are naturally disposed to turn conversely. When the child is pigeon-toed, to stand with the heels together will throw the toes out.

ATHLETIC GAMES

From the physical standpoint, handball is the kingpin. In it the eye must see, the brain must judge, and the muscles must move with lightning rapidity. In fact, as Congressman MacKenzie of Kentucky once said: "In comparison, the lightning is a puling paralytic."

Handball is the exercise of the fit. When a man is fit enough to play handball he is in such good physical condition that he does not need to play it.

Tennis is an expurgated handball. It is also a game for the fit but the same degree of fitness is not required. By beginning with a slow competitor, a man or woman with a soft heart muscle, in fact one who is generally

soft, can stand the pace. In tennis, the eye, the brain, the muscles are not compelled to act with the lightning rapidity of handball; nevertheless they must move much faster than in golf. It is the best of all exercises for men

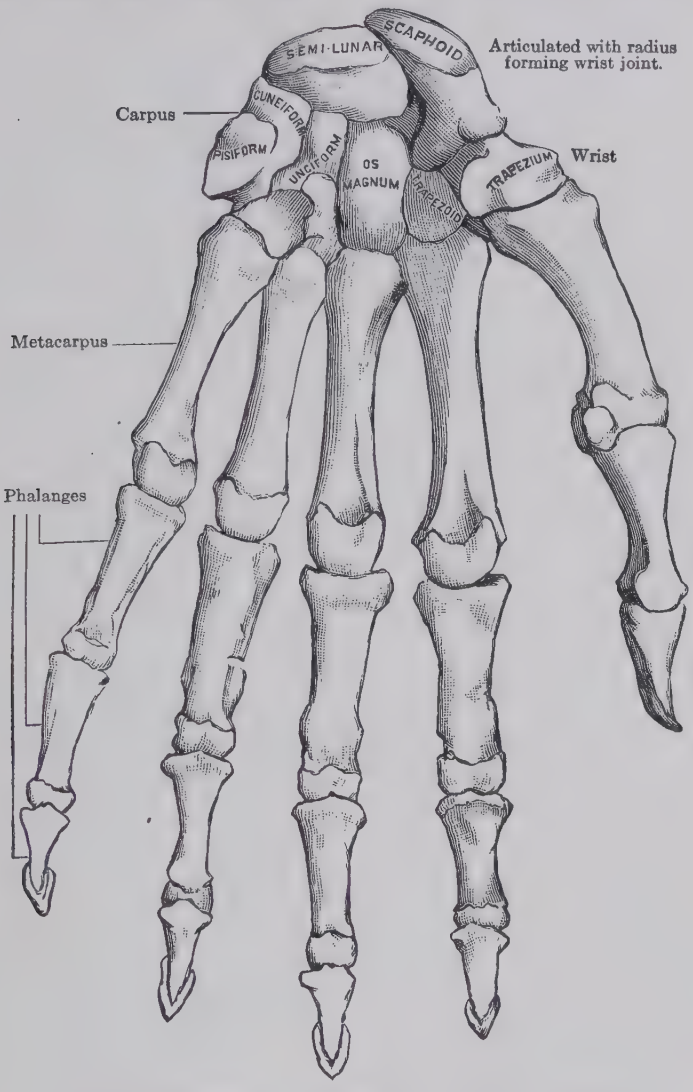


FIG. 424.—BONES OF THE LEFT HAND PALMAR SURFACE.

and women with low blood pressures, no thickening of the arteries, good heart muscles and no special superfluity of fat.

Why baseball should have such a grip on boys does not appear at first glance. It comes pretty near being a game for men of an age in between that of tennis and golf. What spoils it for older men is that 90-foot top speed run—a run occasionally stretching to 360 feet. That run takes wind and, therefore, baseball is a game for boys.

Of all games it has the center of the American stage. It takes hundreds of thousands of people out of doors and gives them an afternoon of fresh air and sunlight; but more than that, it makes millions of boys exercise in the open air during all the months of the late spring and early summer. It is a great health department.

What has made it so is the fact that it is our great spectacle. The spectator who goes wild over the game, the hero worshiper who pedestals the players, the sporting extras, and the pink sheets—these are factors which fill every vacant lot with "kids" playing baseball.

And, in that it makes every boy want to play, want to own a mask and "mitt," the game is worth all that it costs. In fact, it is cheap at the price.

PLAYING GOLF

Golf brings out of doors exercise within the reach of men whose hearts are enveloped in a good deal of fat and whose artery walls are pretty thick. On the one hand, this group of people could not play tennis, handball, or lacrosse. The exercise is too intense. On the other, they will not botanize because it has no competitive features—is not intense enough. They need fresh, clean air and the smell of grass. They need long walks.

They need just that momentary allover muscle tension of driving, the unrestrained muscle action of putting, and the community muscle action of holing. *They need to tighten the play strings that they may loosen the business strings—for all the strings cannot be slack at the same time. They are not built that way—the keyboard would fall to pieces.*

When a man has reached forty years of age without having educated certain groups of muscles to work together for a drive or putt he can never teach them the tricks so well as a young man can train his. But let us not miss the spirit of it. *Golf is a means to an end and competition is incidental. As a means of keeping men and women able to work at a high degree of efficiency during the forties, fifties, sixties and sometimes the seventies it has no equal.*

PLAYING BILLIARDS

A cable is made up of wire through which the electric current passes, insulation to prevent the current from leaking out and wrapping to give strength and protection to the parts within.

When a baby starts to kick its foot it kicks with the whole works from "stem to gudgeon." When a baby starts to wiggle its toe it makes it unanimous—it wiggles all over.

The reason—a baby's nerves have no insulation. When its brain cell sends out word to move a toe the impulse spreads over everything, like water over a levee. The impulse not only moves the toe but it moves a score of muscles uselessly.

As time goes on its nerves are wrapped in insulation and as they become so wasted motion is decreased. After a while the brain can send out an impulse to move a single joint, the impulse travels straight to its appointed place and no energy is lost.

All this is education—education for efficiency.

The billiard player has developed to its highest degree this capacity to move just the right muscles and no others. His eye sizes up a situation, its mathematics, its physics. His judgment weighs one stroke against another. A line of procedure is determined upon.

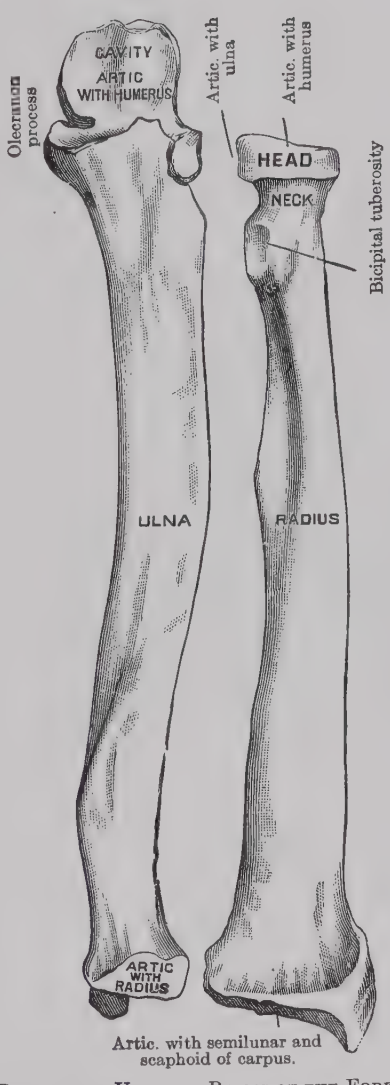


FIG. 425.—LEFT HUMERUS. FIG. 426.—LEFT RADIUS AND ULNA, OR BONES OF THE FOREARM.

The telegrams are sent out from his brain to the different muscles. Each is given just its work to do—no more, no less; each is told just when to do its work—no sooner, no later. The action is loosed.

Upon the judgment the muscle sense, the touch sense, the coöperation, the coördination, the insulation, the work together, the control depend whether the shot wins or loses.

Some have said the measure of civilization is control—that society succeeds if government controls and if men have self-control. Assuming this to be true, governmental control, self-control, brain control, muscle control, are a part of the same scheme.

It is a very poor view of health work that does not include work for a good physical development, a well controlled mind and body. In this broader view billiard playing has its health relations.

Billiard halls are usually badly ventilated. Many prominent billiard players have died of consumption. There could be no better monument to Schaefer and Ives than a solution of the problem of ventilation of billiard halls.

ARCHERY

Women write to me: "How shall I get rid of pimples?" The answer is to "get fit." A prize fighter who is pimply never wins. Women write to

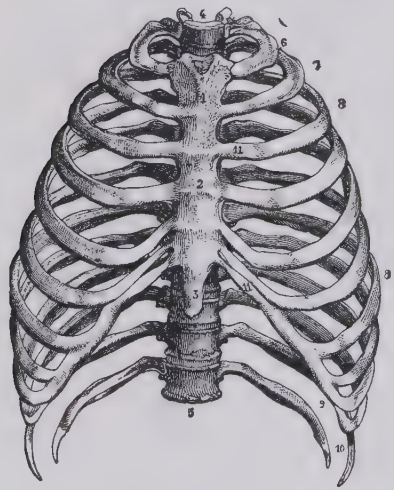


FIG. 427.—THORAX, ANTERIOR VIEW. (Sappey.)

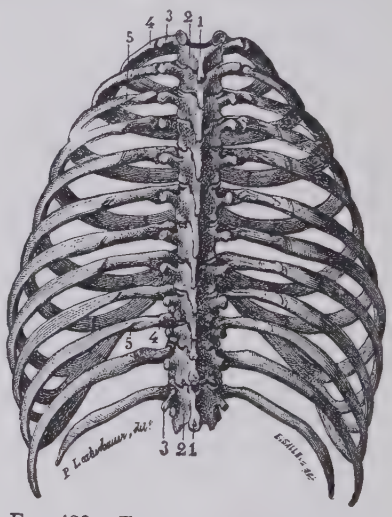


FIG. 428.—THORAX, POSTERIOR VIEW. (Sappey.)

me: "How shall I prevent wrinkles?" The answer is to develop the muscles. The muscles of the skin are a part of the same muscle system as those of the arms.

Women can play any games except football. They should swim and row, play tennis and golf—but none of these gives them any better field than archery.

The training gained in archery is similar to billiards, with the added advantage of being an out-of-doors diversion. In archery the eye must be trained to find a point of aim, which is often a small leaf on a tree sixty yards away. The muscles must be under such control that the arrow is not loosed too soon or too late and, if the arrow is to go right, muscle sense, muscle control and muscle coöperation are all made use of.

Says Miss Leigh in Badminton: "Nevertheless, archery has advantages

over many amusements which renders it specially suitable for ladies. No hurried movements or violent exertion, no ungraceful attitudes or contortions are necessary; it need never be anything but quiet, graceful, and ladylike. And also, there is no restriction as to age—young, middle-aged, and old can all shoot in some form or other if they have bows suited to their strength. For delicate or growing girls it is a most healthy exercise, taking them out into the fresh air; they must hold themselves upright, and their chests are expanded in drawing up. It is a gentle and elegant amusement for young ladies, and most suitable for the matron who feels it undignified to take part in some outdoor games and yet is quite young enough to enjoy them."

Archery develops and strengthens the muscles of the arms and wrists as well as those of the abdomen. Walking to and from the target and bending to pick up the arrows that fall on the ground all bring into play other muscles, especially those of the legs.

SWIMMING

The human animal is somewhat up against it for exercise in hot weather. He knows every muscular contraction means more heat and already getting rid of heat is a question. Furthermore, the more muscle work the more tissue used up and, therefore, the more food required. But the more food eaten, the more heat made. What can be done about it?

Theoretically, he knows he should exercise in the cold but how is that to be done? Why, swimming of course. The answer is plain and there is no other this side of the line of perpetual snow.

When swimming the muscles are working hard, squeezing out waste, pumping in new nourishment—processes good for the muscles, for every other life process within the body—therefore highly desirable.

But these muscle movements make a great excess of heat. If they are made in hot air it is difficult to get rid of this heat. On the other hand, when made by swimming the excess heat is easily got rid of. The temperature of water is 50° to 70°. Water is a better conductor than air; bathing suits are lightweight; swimming fills the bill.

Swimming teaches proficiency in an art which may be a life-saver. It gives an opportunity for plenty of muscle exercise without danger of overheating. It gives opportunity for the stimulus of cold applied to the skin—good in summer as well as winter. Therefore, every community should see that its people have ample swimming facilities, for such facilities are just as necessary to high grade health and first class physical efficiency as garbage disposal, and much more necessary than an excess of paving.

And yet what town pays any attention to its swimming hole? If a village boy wants to go in the creek he must undress and dress on a muddy bank, swim in sewage pollution and then go home to take his chance of a licking.

One of the men rescued from the *Titanic* who was in the water for several hours gave it as his opinion that any man who could have kept a level head should have been able to keep afloat until the rescuers arrived. This man's opinion was right in part, although he apparently overlooked the fact that the average man cannot make heat enough to keep alive when submerged up to his chin for several hours in freezing water.

EXERCISES FOR CONVALESCENTS

Around any hospital one can see men and women feebly walking along the street. Many of them are convalescents leaving the hospitals for their homes and boarding-houses. In a certain sense they are well. Their disease is cured, their operation wounds have healed and they have been asked to surrender their places to others who need to have their diseases cured, who need operations.

Though cured of their former afflictions they are not ready to take up their former tasks. Some are fortunate enough to have good homes to convalesce in. Others can go to the convalescents' hospital at Algonquin or elsewhere. Many must fight for strength under circumstances that do not make for strength.

In the *Journal of the American Medical Association,* April 19, 1913, a New York surgeon, Dr. Pool, tells how he teaches his patients to harden their muscles while they are still in bed. Following this plan, the convalescent can go forth from the hospital with muscles strong and enduring enough to get him home with ease and after a little while he will be equal to a day's work at carpenter's bench or anvil.

The exercises are twelve in number:

1. Bending the feet up and down.
2. While lying flat in bed roll the right foot out and then in. Repeat with the left foot.
3. Lying flat on the back raise the right leg to the vertical position; carry it back. Repeat with the left leg.
4. Draw the knees up one at a time; straighten them.

(After appendicitis operations, hernia operations, and abdominal operations these exercises should be done with caution.)

5. Fist closed and opened.
6. Hands bent forward and back.
7. Hands turned palm down and then palm up.
8. Elbows bent and straightened.
9. Arms carried forward and back.
10. Head raised and lowered.
11. Head moved from side to side.
12. Breathing—very deep.

To get the most good from exercises 1 to 9 Dr. Pool says, "All movements should be performed with voluntary muscular resistance." By this is meant, all of the muscles of a part are held tense while the movement advised is carried out.

To begin with, each movement is done five times each period and there should be three periods a day. The number may be gradually carried up from five to thirty.

The result of this plan is that the patients feel better and get well faster. They leave the hospital with muscles that have some strength in them. Instead of having to learn to walk over again they are able to make their muscles do team work from the start.

One would think that the danger of sudden death would be increased

by these exercises but Dr. Pool says no. Rather, he asserts, will the better circulation and better muscle tone of these patients prevent them from the thrombi and emboli which sometimes cause sudden death in convalescents.

EXERCISES FOR CHILDREN

Professor Sudor in charge of physical training in the Chicago schools recently sent out a book of instructions to principals from which the following is extracted:

"Practically no attention has been paid to posture, and this is only brought about by thorough drill in calisthenics and apparatus work. These movements will tend to develop the chest and trunk muscles, and guard against possible spinal deformities."

The instructions for open-air centers are as follows:

1. Inhale and exhale several times.

Raise arms sideward and inhale; lower arms and exhale.

Rise on toes and inhale; lower heels and exhale.

Bend head backward and inhale; raise head and exhale.

Raise arms sideward, rise on toes, and inhale; lower arms and heels and exhale.

Raise arms sideward and twist, bending head backward, and inhale; lower arms, raise head, and exhale.

2. 1—Hands behind neck, and sit erect—place! Hands on lap—place!

2—Hands behind neck, and lean back—place! Sit erect, and hands on lap—place!

3—Head backward—lower! Raise head, and sit—erect!

4—Head backward, and lean back—lower! Raise head, and sit—erect!

5—Lower head backward, raise chest and inhale deeply—lower! Raise head and exhale—raise!

6—Raise left arm sideward and turn head left—raise! Lower arm, and head to the front—turn!

7—Like exercise 6, but right.

8—Place right hand behind neck and turn head left—place! Lower arm, and head to the front—turn!

9—Like exercise 8, but vice versa.

10—Lower head backward, raise chest, inhale deeply, and lean back. Raise head, exhale, and sit—erect!

The above exercises to be conducted by command. Practice each exercise several times.

Recreation exercises.

Exercises in sitting position.

From the erect position, forearms toward chest, finger tips touching, elbows sideward.

1—Move arms slowly sideward as far as possible, and twist the arms, knuckles down. Return to starting position. Practice several times.

2—Like 1, but inhale at first movement, and exhale at second.

3—Like 1, but lower head backward at first movement and raise head at second.

4—Like 3, but with inhaling and exhaling.

5—Like 1, but with leaning backward, arms over desk in rear.

6—Same, with inhaling and exhaling.

7—Like 6, but with lowering head backward and raising.

8—Like 7, but with inhaling and exhaling.

Exercise in standing position:

From the erect position, forearms toward chest, finger tips touching elbows sideward:

1—Move arms slowly sideward as far as possible; twist arms, knuckles downward, and rise on toes. Return to starting position and lower heels. Practice several times.

2—Like exercise 1, but at first movement inhale; exhale at second.

3—Step position forward left (right) like exercise 1, but with first movement bend left (right) knee, and with second movement straighten the knee.

4—Like exercise 3, but with first movement inhale; at second, exhale.

5—Like exercise 3, but with bending of knee bend head backward, and raise head with straightening of knee.

6—Like exercise 5, but with inhaling and exhaling.

7—Like exercise 3, but with bending of rear leg.

8—Like exercise 7, but with bending head backward, raising head, and with these movements, inhaling and exhaling.

Note: All exercises in sitting as well as standing, especially with breathing, must be practiced slowly.

THE PLAY CURE

It may sound strange, but the play months are the healthy months and the play people are the healthy people.

In May the general death rate drops, pneumonia lessens and contagion declines. Nothing is bad except spring fever and spring fever is nothing more than energy trying to find itself. It is a yearning of the spirit to stop the doing of winter things or to stop doing anything in a winter way. The desire to do is strong but it is a different "do" that is wanted.

Play is educational. It makes for mental and physical training. It makes for judgment. It trains, it breeds bravery, decision and courage; and finally it makes for health, both of itself and through the environment in which it places one. The brain is composed of cells and fibers which bind them together. No cell is separate and isolated. When the brain cells send impulses back and forth coöperating to do a certain thing they train themselves for other kinds of brain work.

Quoting Maria Montessori: "These exercises are truly intellectual gymnastics; such gymnastics reasonably directed aid in the formation of the intellect just as physical exercises fortify the general health and quicken the growth of the body. . . . True rest for muscles intended by nature for action is in orderly action just as true rest for the lungs in the normal rhythm of respiration taken in pure air. . . . To act in obedience to the hidden

precepts of nature, that is rest. . . . The child wishes to coördinate his voluntary actions—to exercise his muscles by lifting, to train his eyes to estimate distances, to exercise his intelligence in the reasoning connected with his play, to stimulate his will power by deciding his own actions."

The keynote to her entire method: Self-development is almost the only pleasure of children.

It is a good thing to have good muscles. They make up 65 per cent of the body weight after leaving out the weight of the passive bones. They do their work. They have no diseases, or rather they have so few that muscle diseases can be forgotten. They protect us against enemies, they take us where the air is good and they establish our breathing requirements; for, as Woods Hutchinson says, "We breathe with our legs."

As the working muscles burn tissue into waste, they use and pollute air—and to renew the supply is the purpose of breathing. The gases flow in the air tubes as far as they go and then they get into the blood cells and are carried the balance of their journey.

Commonly, we say the heart circulates the blood (and it does furnish a part of the drive) but contracting, moving muscles squeezing out tissue juices furnish an important part of it.

The muscles are the servants of the commonwealth. They stand and serve. They have a right to use the motto of the English royal family, *"Ich dien."*

But development of muscle, while important, is not the most important aim of exercise. More important is the use of muscles in groups, each muscle doing exactly its work, no more, no less, and each doing its work at just the right time, not too early, not too late. That is the work of nerve cell control.

Moving the muscles in groups coöperating each with the other is good mental training. No mind is educated or trained until it has taught its cells coöperation and control. Did you ever see an overeducated, bespectacled, learned man who could do nothing with his hands? You haven't quit laughing at him yet, have you? Or had you pity?

A brain gains in abstract power when it gains the power to control muscles, particularly the muscles of the hands—what Hetherington terms the fine muscles—the muscles which are exercised in the arts, crafts and most of the manipulations of skilled labor.

The first point is—it makes for health to build up the muscles and keep them in good condition. The next is—it makes for general well-being to train the muscles to control and coöperation. But coöperation is the basis of society. Coöperation is society. Where there is coöperation things are social. When there is no coöperation things are anti-social.

It is only an easy step to pass from a group of muscles playing together to accomplish an end and a group of boys working together on a baseball nine. And proper play combines all these good things in one. It gives growth of muscles, good muscle tone, proper burning up of waste, good open air brain exercise, mental training, control, spirit, courage, coöperation, community spirit, the social point of view—the whole flavored with zest.

That there is a difference between muscular development and health is attested by Eustace Mills: "I do not consider a mere athlete to be a really

healthy man. He has no more right to be called a really healthy man than the foundation or scaffolding of a house have a right to be called a house." At that, an athlete in that he has mental control over his muscles, is a grade better than the muscular monstrosity whose muscles stand up like Pikes Peak and, like Pikes Peak, are mighty, massive, immovable, useless—a mere knot on the landscape.

Athletics in that they furnish a spectacle have served a most useful purpose. It is easy to see how the spectacle stimulates a desire for better physical development which in turn fills every vacant lot with small boys playing baseball and football and occasionally makes the spectator do a few elephantine stunts. There is no doubt but going to baseball games stimulates many a man to play golf or to swim.

The objection urged against athletics is that it serves to overdevelop the fit and to neglect those who need physical development most—the soft-muscled, the short-winded, those lacking coördination, those who cannot do things with their hands. But that need not worry us. Competition between social units will find a way to become more social. It is only a step from a jumping contest between the best jumpers in your high school or college and those in a neighboring institution to a contest between the average jumper of the senior class of the one against the senior class of the other. When this time comes the jumpers who know how will put in some of their time helping those who do not know how.

The nearest approach to community in athletics is the methods of the Turngemeinden.

From development of a muscle to muscle control was a step, from muscle control to athletics another, from athletics to play is even more a gain, for play combines the social, the muscular and the mental to an exceptional degree.

For a child "the play's the thing," or still further paraphrasing Shakespeare, "All the world's a play and all the men and women merely players." That was not what Shakespeare meant but it is true enough to belong with the myriad of true things said by Shakespeare.

Developing muscles may pall, exercising may become irksome, athletics may lose its relish but the appetite for play abides. In the language of Montague Glass, "Business is business, Mawruss, and sometimes pleasure."

Children need play to get them into the open air, to get them into the sunlight, to make them breathe deep, to grow red faced and excited, to tingle. As Luther Burbank puts it, "Every child should have mud pies, grasshoppers and tadpoles, wild strawberries, acorns and pine cones, trees to climb and brooks to wade in, sand and snakes, huckleberries and hornets, and any child who has been deprived of these has been deprived of the best part of his education."

There is no place where a child learns things so readily as in play. Wirt with his Gary school system is wise beyond his generation in making the playground the place to teach geography, arithmetic, and other didactic branches. But better than geography, play teaches self-control, social sense, honor, enthusiasm, determination, the never-say-die. As Gulick says, "Play is the spontaneous enlistment of the entire personality. We do not have to pursue the goal; we wish to—it is our main desire. The people who accom-

plish things are the people who play the game. They let themselves go; they are not afraid. Play up, play up, play the game."

Says Allen in "Civics and Health": "Hygiene and play teachers would have an incalculable effect on the reduction of tuberculosis not only in making healthier physiques but by inculcating habits of outdoor life and love of fresh air. The danger of those contagious diseases which ravish childhood would be greatly reduced. An ambition for physical integrity would make unnatural living unpopular. Competition in games with children of the same physical class develops accuracy, concentration, dispatch, resourcefulness, as much as does instruction in arithmetic. Smoking can easily be discredited among boys trying to hit the bull's eye. A boy would sooner give up a glass of beer than the championship in rifle shooting or a home run."

Encourage your boy to play marbles, your girl to skate; show your pride in his jumping or in her game of tennis. Plan organized play for your children and do not forget the value of what Colonel Roosevelt terms "unbossed play"—play for the sake of play—spontaneous play—just play.

"THE OUTSIDE OF A HORSE IS GOOD FOR THE INSIDE OF A MAN"

The truth of the above proverb men have always known. The man of the stone age made a close companion of his servant, the horse. Whenever the archeologist uncovering relics of the neolithic age finds the remains of man, he always finds those of a horse near. In the fifth book of the Vonkug we are told that 2,637 years before Christ the Chinese cavalry were placed on the wings of the army.

When the Lord speaking out of the wilderness rebuked Job as recorded in the thirty-ninth chapter of the Book of Job the following reference to the horse appears:

"She scorneth the horse and his rider. Hast thou given the horse strength? Hast thou clothed his neck with thunder? Canst thou make him afraid as a grasshopper? The glory of his nostrils is terrible. He paweth in the valley and rejoiceth in his strength; he goeth on to meet the armed men."

Plutarch tells us that the Greeks at first did not make use of horses. When they saw cavalry in the armies of the barbarians they thought them superhuman and called them centaurs. In their mythology centaurs were descended from the son of Ixion and the cloud and some Magnesian mares. In mythological literature they are taken to signify the rays of the sun, the children of Apollo.

There is precedent for horseback riding. Its bitterest enemy would not charge that there was anything of the fly-by-night about it. Any opinions about its advantages have had time for a tryout. The motto, "The outside of a horse is good for the inside of a man" has stood long enough to have had fair trial. The fact that it still stands is proof that it is true.

Why is horseback riding good for the internal organs? It is exercise in the open air. It fills the lungs full of the freshest and cleanest of air and it gives the sun a fair chance to get in its beneficent work. It massages the

No. 1

No. 2

No. 3

1—Correct chest position: Head up, chin in, chest expanded front, shoulders back and down, neck pressing collar at back. Assume this position, slowly draw in long breath through nostrils and slowly exhale. Repeat until tired.

2—Deep breathing: Assume position shown, fill the lungs, exhale breath slowly through nostrils, pushing the arms forward, bending the body at the same time. Return slowly to upright position, drawing the air slowly into the lungs.

3—Slowly raise the arms from side forward and upward in line with the body, drawing in a deep breath through the nostrils, hold the breath while the arms are swung around (backward) to the side, completing a circle.

No. 4

No. 5

4—Exercise to prevent stoop in shoulders: Slowly inhale a deep breath through the nostrils while assuming the position shown, exhale breath in returning to upright position.

5—Extend arms to position shown and walk into a corner of a room, then inhale and exhale through the nostrils from four to ten deep breaths.

FIG. 429.—EXERCISES TO DEVELOP THE CHEST. (Johnson & Johnson, New Brunswick, *Contagious Disease Bulletin*, 1910.)

abdominal organs, especially the liver. As the body comes down with a jolt into the saddle the liver is caught between the diaphragm and the structures below it and out of it are squeezed all stagnating liquids. The abdominal organs are likewise shaken up.

The great good of riding is in the shaking up. It strengthens the abdominal muscles. The impact of the jolt drives toward the abdominal muscles and these grow strong by resisting.

It develops the leg muscles. It trains the muscles to work together. It stimulates the spirit of mastery. It invigorates and it stimulates. As a measure of personal hygiene it appeals to reason and it is backed by ages of precedent.

Expanding the Chest.—*H. V. K. writes: "Can a man 30 years old, who is 'chicken' or 'pigeon' breasted, as it is called, broaden his chest by breathing exercises, or is the bony structure hardened too much at that age? What is the proper method of exercising for permanent expansion of the chest walls?"*

REPLY.—He may accomplish a little, but not much. Climbing exercises are better than breathing exercises. Ladder work, chinning, ring work—these are types of climbing exercises.

Exercise Rests Tire.—*J. S. D. writes: "Is a two-mile walk beneficial after working in an office eight hours, said eight hours being spent mostly on the feet? Am generally pretty tired by the time I reach home. Will the good gained from the oxygen eventually offset the tired feeling?"*

REPLY.—Yes, one kind of exercise rests the tire produced by another.

Play in Open Air.—*M. W. writes: "I am 24 years old, and 5 feet 6 inches in height, but I weigh only 117 pounds. I am troubled with a pain in my back below the waist and sharp pains around my heart, and I feel tired nearly all the time. I sleep and eat well. Do you think I ought to see a physician, as I am losing weight steadily."*

REPLY.—You are underweight and are losing weight, but that seems to be about the only trouble with you. Suppose you have a careful physical examination. If nothing is found out of the way do enough work in the open air to get up an appetite and to get your nutritive apparatus going right. People who feel tired all the time do not work enough. If you can do it, play in the open air—that would be better still.

Not Injurious to Health.—*N. M. W. writes: "Do you consider motorcycle riding liable to injure in any way the health of the average person? I hear motorcycles called kidney destroyers, producers of floating kidney. What is your opinion?"*

REPLY.—1. No.
2. Nothing to it.

Exercise for Muscle.—*Subscriber writes: "Will you kindly inform as to what foods I should eat to gain weight? I am 19 years old, and I weigh only about 115 to 120 pounds."*

REPLY.—A 19-year-old boy weighing 120 pounds should not eat to gain weight, regardless of his height. "Subscriber" does not state his height. Let him exercise for muscle and let eating take care of itself.

Too Much Exercise.—*L. M. H. writes: "Do you approve of gymnasium exercise in the evening for a woman who works during the day as a clerk? I have been going to a gymnasium class twice a week for about an hour each evening, being of the impression that the exercise would benefit my health generally. I find that the next day I am fatigued generally, that is, my muscles are sore, my back aches, my head aches, and all together I feel miserable. This lasts for two or three days. I am a clerk in a department store and, of course, am on my feet and get quite a bit of exercise during the day. I am thirty years of age. I am told that this condition will last only for the first few weeks, but I have been going to gymnasium for six weeks, and my condition does not improve; that is, I don't seem to be getting used to the exercises at all. Do you think it wise for me to keep on?"*

REPLY.—Clearly the exercises you are taking are too strenuous for you. An excellent method of resting is to exercise the groups of muscles not exercised by the day's work. To plan such exercises requires thought.

Whenever one is sore after exercising it is proof that too much exercise has been taken.

Needs Outdoor Exercise.—*B. S. B. writes: "Do cold morning baths make one nervous? I have been told they are good for a person, but a few days ago someone said they made people nervous. I know I am terribly nervous, and don't know the cause. I eat and sleep well, but my head and eyes ache all the time. I went to an oculist and got glasses, but they do not seem to help much. I am a stenographer, so my work is naturally hard on the nerves. The cords in the back of my neck get stiff often. I seem to be on a strain all the time and catch myself holding portions of the body stiff, and cannot seem to relax. Any little thing upsets me. I am in an office where there are a good many and it is noisy. I think sometimes I cannot stand it. I do not think going to a doctor and taking medicine would do me any good."*

REPLY.—One cold bath may increase nervousness temporarily. Systematic cold baths are a tonic. You need exercise in the open air. You also need to learn to control your nerves. See if studying "Physiology of Faith and Fear," by Sadler, or "Conquest of Nerves," by Courteney, is not what you want.

Physical Exercise.—*Blank writes: "I am 19 and studying pretty hard at school. Do you think it advisable for me to go through certain physical exercises in my room just before going to bed? Also is it a good plan to take a run around the block before breakfast in the morning?"*

REPLY.—Yes, as to each question.

Horseback Riding.—*H. L. W. writes: "What do you think of horseback riding as an exercise? I am tied down to my office a good deal, not active enough for baseball, and too young for golf (they tell me it's an old man's game); tennis bores me."*

REPLY.—Go to it. If you want to know how many muscles it exercises, ride six hours and then try to find a muscle that is not sore. Golf is an old man's game in the sense that an old man can play it. It is a young man's game as well.

Riding Astride.—*Constant Reader writes: "1. Is riding horseback astride injurious to girls? 2. Can this be carried to excess without injury to the girl's general health? 3. Will horseback riding moderately, astride, be likely to affect the girl's health later in life? In other words, is it a menace to the race?"*

Reply.—1. No.
2. No.
3. No.

Perhaps the answer to question 2 requires modification. Anything can be done to excess but I interpret your question to mean: Is there anything in the anatomy or physiology of girls that makes horseback riding more dangerous or more harmful (when it is dangerous or harmful) for them than for men?

Skating Fine Exercise.—*B. H. writes: "Is skating more unhealthy than visiting saloons and moving picture theaters? If not, why do the South Park commissioners refuse us our usual skating in Jackson Park this winter?"*

Reply.—Skating is about the healthiest exercise that has been devised. It keeps you out of doors at a time when house air is hot and infectious. We cannot understand why they do not allow skating on the South Park ponds in winter and swimming in them in the summer. We hope you are incorrectly informed as to skating not being on the program for the winter.

Advice on Tennis.—*C. F. H. writes: "How about tennis for recreation for a fairly robust man of 36, engaged at desk work? Is a good hard 'man's game' of one or two hours too strenuous? Would a heart examination be advisable before commencing, presuming that the subject had not played for four or five years?"*

Reply.—1. It is all right.
2. To begin with, yes; after the muscles have hardened up, no.
3. Not unless you have reason to think your heart is off.

Gymnastic Dancing.—*B. P. writes: "Would it be injurious for a woman of 46 to take gymnastic dancing if her general health is good?"*

Reply.—No.

Enter a Gymnasium.—*L. J. S. writes: "What would you advise me to do to develop my arms? When I was 14 years old I worked in a factory where I had to swing a heavy hammer. I had to reach far up over my head and pound hard. I remember having lumps as large as pigeon eggs under the arms. Do you think this incident had anything to do with my arms not being developed? They measure only seven and one-half inches. I am 32 years old, weigh 165 pounds, and am 5 feet 11 inches tall. My chest measure is 37 inches. I am not strong."*

Reply.—The part of your arm referred to is the first four inches measuring downward from the tip of your shoulder. That part of your arm is largely made up of muscles which run from your body to the upper part of the arm. In doing the work described you would use just those muscles. Probably you overused them and thereby injured them. The lumps under your arms were enlarged lymph glands. These enlarged glands meant

that you were suffering from some infection about that time. The two acted together to harm you. Carefully regulated exercise should build you up and increase the size of your arm muscles. If you can, join the Y. M. C. A. and have the physical director lay out an exercising plan for you.

Needs More Exercise.—*J. M. writes: "What is the cause of that eternally tired feeling in the case of a woman of 40? She sleeps fairly well and has a good appetite. Often she rises in the morning as tired as when she went to bed the night before. After dinner she is ready for bed and scarcely has enough strength to undress. She weighs about 120 pounds and is under average height."*

Reply.—She is neurasthenic. She does not exercise enough. Pusey says, in "Care of the Skin and Hair": "The average person who is tired all the time, who, after a day of ease, finds himself worn out at night, is, as a rule, not a victim of overwork or nervous fatigue but of too much food and too little exercise."

Should Take Exercise.—*S. T. B. writes: "I am a young man, 21 years of age and 5 feet 2 inches tall, and weigh only ninety-five pounds. Please advise me what to do. I do not use liquor or tobacco."*

Reply.—You are nearly twenty pounds underweight and are undersized as well. If you will trace back your ancestry you will find some inherited reason, either in your parents or a little further back. You ought to exercise as systematically as you eat. That is, you should give a part of each day to exercise, preferably in the open air. You can increase your weight and stature fairly well in this way, although in the latter you will never get up to the average.

Exercise After Operation.—*N. writes: "Having had an abdominal operation, later a rupture and it also operated upon, is it safe to take swimming exercises, or to roll or lift the hands over the head and down to touch the floor? I fear another strain, maybe another rupture. I wish to exercise to keep from getting stouter."*

Reply.—Begin swimming and the bending exercise mildly and gradually increase them. Violent strain is liable to cause the weak places to give. On the other hand, if flabby muscles do not do their part of the holding up the weak places are threatened. The policy of gradually and slowly building up tone in the abdominal muscles incidentally strengthens the weak place.

Exercise for Women.—*A. X. writes: "I wish you would write upon the advisability of women returning to the bicycle. My patients are so fat and unwieldy it would be simply a new lease of life for them; but, alas, the bicycle is not fashionable. If clubs were formed it might be brought back, and your advice would help. The average well-to-do woman of today is a horror when undressed. I mean women between 30 and 50. They usually suffer from some disease; real or otherwise. No woman who rode five miles a day would ever get to be out of shape. I am a masseuse and trainer, and know all about fat and what it does. I wish you would help. If some power could make women exercise, eat less, cut out all alcohol etc., there would be fewer divorces."*

Reply.—I wish you success in your efforts to convince women that the figure is developed through exercise. One of the methods of positive

eugenics is to teach men the difference between a good female physique and one that appears so by reason of clothes and accouterments.

Special Exercise Necessary.—*M. L. M. writes: "Am a matron of 31, in apparently good health, but since fall set in have been constantly troubled with cold feet, especially at night. After I go to bed I have a near chill, sometimes lasting all night. What is the trouble and what the remedy? I take plenty of outdoor exercise and eat simple, wholesome food."*

Reply.—You are a poor heat maker. Since you make so little heat your heat regulating apparatus economizes by sending as little as possible to your skin, especially to the skin of your hands and feet. First, you should know whether you are anemic or not. You may have to leave this to a blood test. If anemia is not the cause, you must decide whether you will make more heat by muscular work, heavier eating, cold baths, air and water, followed by a brisk rubbing or whether you will increase your comfort by heavier clothing, particularly stockings. Old people must follow the latter plan. Young ones should follow the first. The young ones, if healthy, can train themselves to be good heat makers. Blood vessels in the feet and hands of old people cannot carry enough blood to keep the skin warm all the time. They must help out by using woolen clothes to retain the heat in the skin.

S. C.'s Exercises.—*Morning exercises which have kept S. C. and his son in prime condition:*

Lying Prone on Bed or Couch.—For the trunk:

1. Hands clasped behind head, sit up.
2. Raise legs perpendicularly, knee stiff.
3. Arms folded, sit up.
4. Draw up legs, knees bent.
5. Hands extended above head, sit up, bend over, and touch toes.

With a Chair.—For the arms:

6. Right arm extended at side; lift chair, then rest.
7. Left arm extended at side; lift chair, then rest.
8. Both arms extended in front; lift chair, then rest.

Standing in Doorway.—Additional for arms:

9. Heels against back jamb, body thrown forward; push it with both arms to erect position and let it fall forward again.
10. Toes against front jamb; grasp casing on either side of jamb with fingers; let body go backward to extent of arms and pull forward as far as possible.

For fingers:

11. Grasp casing above door and raise body on fingers to tiptoe position.

For toes:

12. Rise on tiptoes and with hands against top of doorway push body down.

Standing Free.—For neck and shoulders:

13. Hands on hips, fingers pointing backwards; throw the head forward and then back as far as possible.

For legs:

14. Left foot forward, hands extended above head; bend over and touch toes.
15. Right foot forward; same.
16. Heels together, knees stiff, hands extended above head; bend for-

ward and come as near touching toes as possible so as to stretch the back leg muscles.

Take a full breath before each movement and let it out as the movement proceeds so as to get a rhythmic relaxation of entire body.

Twelve to fifteen repetitions of each movement. Follow with a cold bath or rub with dry towel if possible.

Benefit from Massage.—*C. L. writes: "Would you kindly answer the following queries:*

"1. Is there any benefit derived from vibratory massage for weak muscles?

"2. Is Faradic electricity good for the same, in conjunction with massage?

"3. Is the galvanic current also a benefit?

"4. Which is the best?

"5. Should the massage be applied before or after electric treatments?"

REPLY.—1. Yes.

2. Yes.

3. Yes.

4. Faradic.

5. Makes no difference. If exercise in the open air is possible, it is much better than either or all.

Exercise to Prevent Cramps.—*L. W. L. writes: "Please state the cause and prevention of cramps in the feet of elderly persons who lead more or less sedentary lives."*

REPLY.—Cramps come from lack of use of the muscles. Muscular exercise systematically carried out is the way to prevent it. Cold air, cold baths and persistent exercising is the way to ward off attacks of cramps while swimming.

Swimming Better Exercise.—*H. C. L. writes: "Do you recommend running as a summer exercise? What is the longest distance a boy of 18 may run each day with no bad effects? Is it advisable to run before breakfast? Is it better to swim?"*

REPLY.—1. Yes.

2. Depends on the boy and the condition he is in. Run enough to keep your muscles in condition. If you are stiff or sore afterward you have overdone the exercise.

3. Yes.

4. Yes, swimming is better than any other exercise in hot weather.

Effect of Swimming.—*Mrs. S. C. H. writes: "I have been in bathing and swimming four times this season, and each time on leaving the water I notice my lips are blue and my finger tips numb. Will you please tell me if I should discontinue? I do not think I have heart trouble."*

REPLY.—Probably you remain too long in the water. If a short plunge causes the same effects refrain entirely.

Exercise Before Breakfast.—*C. J. M. writes: "When I arise I have no appetite, but regain it later for dinner and supper. What is the cause of this? Will one-half a glass of warm water before breakfast help any?"*

REPLY.—It is all right to drink a glass of warm or cold water as one of your bathing stunts on arising. Ventilate your room better and get a little exercise before breakfast.

Exercise Out of Doors.—*Exhausteds write: "1. It is our understanding that you do not approve of blood purifiers, such as old-fashioned sulphur and molasses, etc. Do you advise some substitute? 2. Is there any way for business girls, confined in offices, to offset that tired feeling which is inevitable in spring? We sleep with our windows wide open and eat as sensibly as we know how. We abstain from tea, coffee, and pastry."*

REPLY.—1. No.

2. Out-of-door exercise—walking, tennis or golf—will turn the trick.

Do Gymnasium Work.—*C. R. wishes to know what will help a woman who has a well-developed figure but is chicken-breasted and has a prominent right shoulder blade.*

REPLY.—Take up gymnasium work persistently until you have developed the muscles in your back. You will find that your right shoulder blade is prominent by reason of a lateral curvature of your spine. Gymnasium work will lessen this though it may not wholly remove it. Gymnasium work will do as much for chicken breast as anything you can do. Not much can be done for chicken breast in people over 15 years of age.

Rowing Good Exercise.—*Elmer writes: "I am desirous of knowing the best way to develop my arms, especially from the elbows down to the wrist. Am 35. Not ever having done any manual labor, they are undersized."*

REPLY.—The muscles below the elbow bend the wrist joint and close and open the fist. Any stunts which call for gripping develop these muscles. The wrist work of rowing is helpful. Bob Fitzsimmons developed his forearm by blacksmithing.

Stop the Exercise.—*D. S. L. writes: "Have a slight and intermittent pain in the heart, due to overexertion in a gymnasium. What is the danger and what would the trouble be known as?"*

REPLY.—A pain in the heart due to overexertion in the gymnasium is cause enough for stopping the work. Have your heart examined when you are suffering from this pain and just after exertion. If you are right in concluding that the cause is exercise stop the exercise.

Bathing Bracing Practice.—*D. H. writes: "At what temperature of the water do you consider it dangerous to swim in Lake Michigan? I have been going into the lake since the middle of the summer, when the temperature of the water was about 70 degrees. It is now about 54 degrees and going down about 2 degrees each week. By continuing to go into the lake am I doing something dangerous, or is it a good thing for me? I have normal health and do not feel chilled after coming from the water."*

REPLY.—Daily bathing in the lake after rising by the young and robust is one of the most bracing practices and is of great assistance in warding off colds and catarrhs.

The minimum temperature at which lake bathing is permissible de-

pends greatly on the constitution of the bather and the amount of "hardening" he has undergone. The exact minimum temperature will vary in different persons. One must rather depend on the physiological reaction.

If the reaction—that is, the rush of blood back to the capillaries of the skin after emerging from the water—and a pleasant, glowing sensation accompanying it are present the bathing is not harmful. If the sensation of chilliness and blueness of the lips and finger nails are noticed, with the reaction delayed or absent, then the water is manifestly too cold.

Massage and Exercise.—*Mrs. L. H. G. writes: "Over eight weeks ago I fell on the stairs, hurting my left leg at the top of the shoe. A lump appeared immediately. The skin was broken. The leg from the knee to the foot swelled badly. Later both sides of the foot turned black and the discoloration extended to the top of the foot and over the ankle, but it was not so dark as on the sides of the foot. I have worn an elastic bandage with good results, but when it is removed and I walk much the swelling is extreme. My age is forty-seven. Is that significant? Am suffering with a little touch of rheumatism in my fingers, but the foot trouble appeared first, I think."*

REPLY.—Your injury has stopped one of the channels by which fluid returns from your foot to your body. The condition will pass away in time if you do not neglect it. Other channels will enlarge to do the extra work. Massage and exercise that foot and leg systematically every day unless the soreness forces you to exercise at longer intervals.

Walking Good for People.—*M. O'N. writes: "What about walking for women? I am a stenographer employed in the city and walk to my home, or from my home to the office, a distance of seven miles, at least once a week and often twice a week. Two weeks ago Sunday I walked from Wilson Avenue to Fort Sheridan, a distance of twenty-three miles. Is this too much for a woman 25 years old in perfect health?"*

REPLY.—No. I wish you could influence a few thousand people to walk more.

Continue Swimming.—*B. R. D. writes: "Will you please help me out of a difficulty? The last two times I have been out bathing my skin all over the body turned a dark purple, almost black. My health is good and I enjoy the water. What is the cause? Is there anything to do to avoid such occurrences, or would it be better to forego the pleasure entirely? If it is caused by the temperature of the water, why does it affect me that way and not others?"*

REPLY.—Your skin circulation is more susceptible than that of your companions. Continue your swimming but exercise more actively. The purple color will pass away when you swim or splash hard enough to get in a glow.

Roller Skating Example.—*W. G. G. writes: "I like your article on swimming, etc., for the young of our city. The authorities could follow with profit one thing done in Kalamazoo, that of roping off two or three blocks in different sections of the city from traffic in the early evening hours for roller skating. It would do you good to see the crowds of youngsters enjoying themselves here each evening."*

REPLY.—Cities everywhere should follow the lead of Kalamazoo.

Exercise in the Open.—*C. A. H. writes: "I have been troubled for some time with a feeling of depression not due to a melancholy nature. I have a desire to yawn constantly and find it difficult to get a good, deep breath without a sigh or yawn. Thinking it might be due to indigestion, I have eliminated all pastry from my diet, and endeavor to eat nothing but healthy food. I have not drunk coffee for some time. I am taking an iron tonic. Do you think this could be heart disease? What more can I do to overcome it?"*

REPLY.—I do not think it means heart disease. Get some vigorous exercise in the open air—swim, play tennis, golf, or something equally violent. You need to have your heart beat fast, your face turn red, your lungs draw deep and your skin sweat.

To Strengthen the Ankle.—*Reader writes: "Can you tell me how to strengthen my foot? Some time ago I worked a foot press for about two years and have in the last year been troubled with my ankle. I cannot bend it outwards. It seems to have no give to it. Sometimes it bothers me much, then again I have no trouble with it."*

REPLY.—The ankle proper should not bend out. There is a little in and out bending leeway in the foot below the ankle. The best way to strengthen the ankles and feet is to exercise regularly and habitually the muscles of the legs below the knees. If this is kept up the ankles get strong. There is no other remedy. But do not try to stretch the lateral ligaments of the ankles, for a foot which turns in and out is not worth much to walk on.

Take More Exercise.—*S. F. M. writes: "Please tell me the cause of and cure for frequent and deep yawning in a man of 55 years of age. I am in good health, my work is light, working hours short, I sleep well, am not a heavy eater, not especially strong, although exceptionally active and energetic. I yawn heavily and long, perhaps twenty-five times a day, during my waking hours. Does this indicate anything constitutionally wrong with me, or a condition needing a physician's attention?"*

REPLY.—You are not getting enough air to your tissues. It may be that the room is not ventilated, that you do not take enough air into your blood through your lungs, that your blood does not carry enough to your tissues, or several of these combined. There are two things to do—ventilate better and get more exercise. If you eat a heavy meal you especially need to exercise during the succeeding four hours.

In Need of Exercise.—*M. writes: "You have stated that the arteries age from wear and tear, which are causes of arteriosclerosis. Should a person, then, of middle age do as little physical work as practicable? Would not moderate gymnasium or other exercise be beneficial, even to one in the fifties, by giving tone to the muscles of the arteries, heart, and elsewhere?"*

REPLY.—Enough exercise, either golf, gymnasium work or other work, to keep a man's muscles firm is advisable. The man of fifty needs it a little more than does the younger fellow.

More Exercise Needed.—*Miss L. J. writes: "Kindly inform me what causes blind spells and dizziness, also a fever every morning until about noon. I am about 5 feet 8 inches tall, weight 137 1-2 pounds. My appetite*

is good and I sleep well, with the exception of a dry cough occasionally at night, but never during the day. I have also had pains coming from the heart. Would this indicate heart trouble?"

REPLY.—Blind spells and dizziness in a young woman generally mean that she is eating too much and exercising too little. Fever every day and cough frequently mean consumption. If you are certain as to the fever by all means have your chest examined carefully, especially for consumption.

CHAPTER LVII

Posture—Height

POSTURE

MAN AND HIS POSTURE

Early in the game the animal man was having a hard time competing with the other inhabitants of the jungle. He was shrewder than they and he pitted his brains against their strength and endurance. To his mind the suggestion came to rise up on his hind legs and to release his forelegs from the duty of carrying him; it should be possible to change his center of gravity and two legs were enough to carry any animal around.

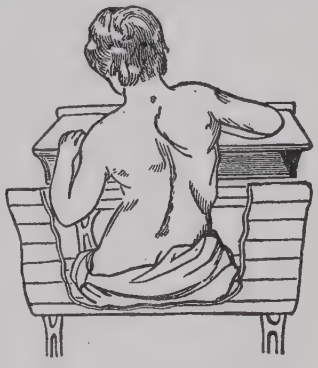


Fig. 430.—Bad Posture, Due to Desk Which Is Too High.

Mowgli was right. The monkey tribe constituted the only people shrewd enough to see it in that early day and at that they tried to compromise. Said they:

"This walking on the hind legs is a good thing in some cases, but there is about half the time when the old way is the better way. We, the *banderlog,* have more wisdom than *Mowgli.* We will walk on two legs when that is best and on four when that way is best."

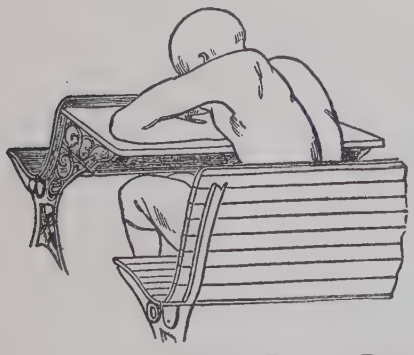


Fig. 431.—Bad Posture, Due to Desk Which Is Too Low.

The *banderlog* missed the essential point. The reason for walking on the hind legs was to free the forelegs for other work. *Work* was more important than walking.

The upright posture is far from being a perfect posture for man. In the thousands of years that he has been walking that way he has not wholly rearranged himself on that basis. Many of his anatomical points are on the old basis. From an incomplete adjustment the appendix results and in its wake comes appendicitis. From it comes constipation and the list of ills that follow it. *In many things in life we gain by following our animal instinct. When in doubt in many situations the way to trump is to follow instinct.*

However, this is not true of posture. Man holds himself upright as the result of the call to higher things. His instinct would make him slouch and slump.

The spirit in him calls on him to toe, to stand straight and square, to hold his head up and his chin in and to look straight to the front.

The animal in him, the great instinct that has come down in his germ plasm through the ages, bids him slouch.

When the best in him is dominating he stands four square. When he is worn by sickness or by age he stoops.

One of the helpful chapters in Bancroft's "Posture of School Children" is entitled "Erect Carriage as an Expression of Intelligence and Character." He says:

"That a person standing erect looks to be more intelligent and energetic than one in poor posture needs no argument; it is self-evident. Under this appearance, giving it reality, lies the biologic fact that the erect position has been coincident with the development of the brain as it exists in man."

Fig. 432. — Faulty Posture Favoring Enteroptosis.

Fig 433.—Faulty Posture. Enteroptosis.

The way a man stands tells many stories of his life to those who have learned to read. Eugène Sue told us of men who worked in one position until their bodies got set in that position. So sometimes we can learn of a man's trade by the way he stands; we can learn of some of the ill health experiences through which the man has come; we can learn of the experiences of childhood.

The character of the man, his occupation, his disease history and the experiences of his childhood—even though each of these stories is incompletely told it represents a good deal of talk to the person whose observation has been cultivated.

During the years of childhood and youth there was no chance to learn how to stand, how to walk, and how to live and in consequence in early manhood pains and aches and inefficiencies have developed.

There was no way of learning about the arches of the feet, the work of the toe and that of the heel. The sentiment about small feet and pretty feet was working at its trade. Before chance to know was at hand tight shoes had dwarfed the toes, twisted the bones of the feet around until nerves had got out of their grooves and blood vessels were pinched at every step.

The same is true, though in lesser measure, of the shoulder girdle. The nerves, bones, arteries and muscles do not fit so snugly as they do in the feet, but sagging shoulders do press at times on structures which resent the pressure by pains, aches, and tires. Much of the pains and aches called neuritis, rheumatism, gout, and other names that signify disease are the result of such maladjustment.

This factor is important enough to be the basis of at least two schools of healing. As a general proposition, however, those schools place emphasis

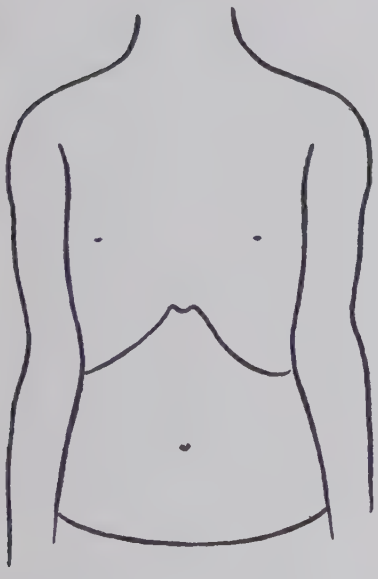


FIG. 434.—NORMAL BROAD CHEST. Wide angle between rib margins, giving wide upper abdomen.

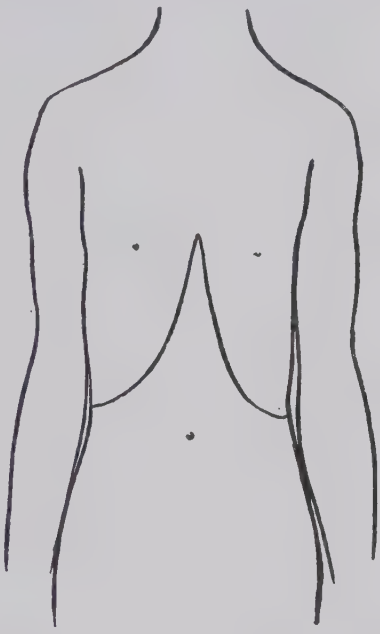


FIG. 435.—ENTEROPTOTIC BUILD. Long, narrow chest and abdomen. Long, narrow angle between rib margins.

upon the nerves which emerge from the spinal column in a position to be pinched. The degree of distortion of the spinal column is never so great as is frequently found in the feet, and the more general opinion is that exaggerated curves or lack of curves in the spinal column do harm by disturbing the cubic capacity of cavities that contain vital organs rather than by pinching nerves.

Dependent upon the curves of the spinal column are the chest, occupied by the heart and lungs, and the abdomen, occupied by the digestive apparatus.

When man walked on all fours his heart had less work to do. Walking upright adds to the work of the heart and therefore when the heart is diseased the shoulders droop forward—an effort is unconsciously made to fall back into the position of ease.

On the other hand, the lungs are better off in the present human chest than in the old-style arrangement.

The hands are seldom used together. Almost everything done by the

hands is done better by one hand. This makes it possible to do two things at a time, one with one hand and one with the other.

Again, all down the line this release from the need of using the two hands together has made it possible for the chest to broaden out.

Man is born with a deep, narrow chest—a tendency to return to the old animal type. If the gain is to be held it must be fought for. The broad-shouldered type must be cultivated; it is not natural.

The most important curve of the spine is that in the abdominal region. It is known as the lumbar curve. In young children there is no sway in the back. In grown people a sway is natural.

Fig. 436.—Enteroptosis, Showing Head Forward, Shoulder Blades and Lower Part of Belly Prominent.

If it is too great the abdomen will pouch out in front and the pouching may seriously interfere with the digestion and assimilation. About as many people of middle life are made inefficient by reason of large girth measure as from any other cause.

As a further consideration, unless the lumbar curve is as it ought to be the pelvis tilts and too much or too little pressure is exerted on the pelvic structure.

Some of the people who limp around with sciatica and other leg pains get no relief from liniment and neuralgia medicine because the real basis of the trouble is in the way they stand.

The spinal column has some twenty-five joints in it. If the column were straight every step would jar all the delicate machinery of the body. There must be curves in the column for the same reason that automobiles have pneumatic tires.

A back curve is needed in the chest for the lungs and the heart. You cannot curve the column back in the chest region without curving it forward in other directions to make up for it. There must be compensation.

There is a forward curve in the neck and one in the abdomen to make up for the backward curve in the chest. If any one of these bows curves too far in one direction there must be a compensating increase in the bows in the other directions. If the abdomen pouches out too far then the shoulders must rear back too far, which adds to the inefficiency.

The human body is a machine. This machine does not move forward with the minimum expenditure of energy when it starts from a backward slant. It is easier to maintain a column in the straight line than it is to maintain a series of curves.

All of these weights hung some on one side, some on the other, but so placed as to maintain the vertical in balance represent an artificial condition.

The broad-shouldered base of the pyramid high in the air five feet or more from the ground, tapering to the apex of the pyramid at the ankles—all this is artificial.

The pitching forward of the body held rigid and the catch on the heel, the physics of walking which Goethe first showed—this, too, is artificial.

When strength, virility, elasticity are gone the gait is a shambling amble. The enfeebled person drags, slops along.

The upright posture has made it possible for the human race to develop a thumb and a prehensile hand; to develop arms that work better when working singly; to develop a flat chest; to develop a resistance to wind and storm; to bacteria; to artificial conditions of living unapproached by any other animal; to develop a brain that puts man in a class by himself.

A proper posture gives one individual a great advantage in health and efficiency, in mental vigor and spirit, over another. But it is not a natural posture with man.

Many of his anatomical structures are not adjusted to it.

Its best can only be secured and held by training begun in youth and continued through life.

STOOPING SHOULDERS

I know of nothing more quarreled about than stooping shoulders and I know of nothing else about which quarreling accomplishes so little. There must be a reason. There is a reason.

A person carries his shoulders stooped because that is the easiest way for him to carry them. To carry them in any other way means ache and fatigue. So long, therefore, as the boy is near his mother or the commandant he will carry his shoulders square. As soon as he forgets it down they go, for down is the easy, comfortable position. It is the position in which he works most easily, because in that position the bones fit and in no other position do they.

All athletics, all work, is done with the bones in their natural position. The ramrod, square shoulder is fit for dress parade and nothing else.

Nevertheless, some girls and boys have bad shoulder positions. Caught early, the bones can be made to sit in a position which will improve with age. Stoops left to themselves will lead to bone positions in which the tendency of the slide in the years to come will lead to worse positions.

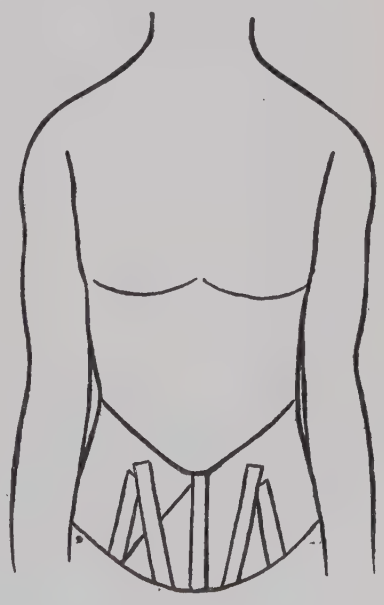


Fig. 437.—Belt for Enteroptosis. Straps between thighs hold it down.

Why is it that instructors meet with such poor success? Because they, parrotlike, ding-dong: "Throw your shoulders back!"

The shoulders are not to blame. The shoulders are great, broad, flat bony plates working on the rounded ribs. If the chest is too barrel-shaped the shoulders naturally stoop. The instructor, to get results, must go back at least as far as the ribs.

The chest gets progressively more flat from birth to adult life. During the first fifteen years the flattening is 21 per cent; during the remainder of life it is only 8 per cent.

Therefore play, exercise and athletics are to be taught in childhood. Climbing trees for both boys and girls stands at the head of the list. But the instructor must go even back of that.

Hard teething, summer complaint, rickets, in fact any severe illness in the first two years of life, mark up the body more or less permanently. One of the methods of marking is some form of barrel chest over which the shoulders slide to cause stooping shoulders.

Again, the error, as Mosher has shown, may not be in the shoulders or ribs. She finds a group, particularly in girls, where the trouble is with the curves in the backbone.

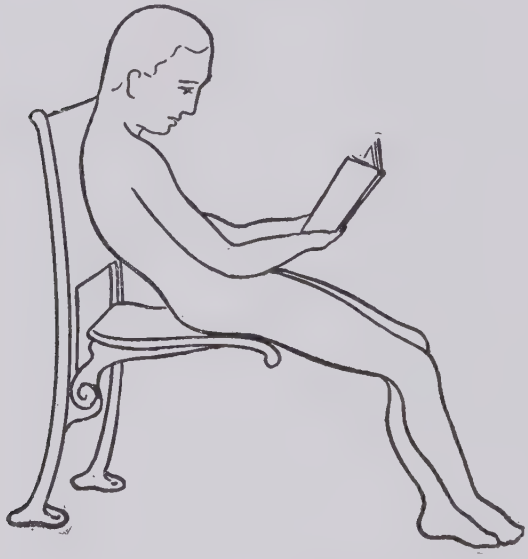


Fig. 438.—Faulty Posture Favoring Enteroptosis.

In order to take the stoop out of these girls she tells them to stand so that their dresses hang low in front. This pitches the lower spine curve forward and back goes the shoulder curve to hold the equilibrium.

An idea prevails that stooping shoulders box in the lungs and thus predispose to consumption — which is wrong. Consumption causes stooping shoulders by using up the fat and weakening the muscles so that the shoulders slide forward—the winged scapulae.

The most important point is that the narrow-chested folk who are especially susceptible to consumption are built right for the shoulders to slide.

If a man is long chested and well muscled let him leave his shoulders where they are. In that way he will get the greatest efficiency and work with the least fatigue.

The army has abolished the ramrod attitude except on dress parade. Ramrod attitude and dress parade are both playthings.

NARROW CHESTS

The chest of a baby who has never breathed is broader from side to side than it is from breastbone to back. Soon after it begins to breathe the

chest is about as broad as it is deep—in other words, it is round. As time goes on it continues to get flatter until at puberty the depth from breast-bone to back, as compared with the width, is as 100 to 80. When adult life has been reached the proportions are 100 to 70 as compared with the youth and the infant. The adult chest is flatter.

Now, averaging a large number of people, it has been found that consumptives have round chests and hatchet chests rather than flat chests. The disease develops more frequently in people with the puberty type of chest form than in the adult type. The teaching of these observations is that disease and deficiency are prone to develop in those whose chest development has stopped at the puberty type—has not gone on to the adult shape.

FIG. 439.—NORMAL CHEST AND ABDOMEN. (Herb.)

FIG. 440.—FLAT CHEST AND SAGGING ABDOMEN. (Herb.)

FIG. 441.—SHOWING DIFFERENCE BETWEEN FIG. 439 (heavy line); AND FIG. 440 (dotted line). (Herb.)

The shoulders and the shoulder blades are hung on the bony frame of the body proper something as a coat is. To take out stoops and straighten shoulders the work must begin back of the injunctions to "throw the shoulders back," to "stand square shouldered." To begin with, there should be systematic breathing exercises—not for any effect on the oxygen of the blood but to develop the muscles of the diaphragm, abdomen and chest wall and to change the shape of the chest box from narrow and deep to broad and shallow. *To breathe in and breathe out violently using every helpful muscle everywhere, if begun early and persisted in, will cure stoop shoulders by giving the shoulder blades a flat surface to lie on.*

At the same time undue accentuated curves on the spinal column can be straightened out by developing the two sets of muscles which run up and down it. One set is just behind this column and bends it backward; another is just in front of it, or its processes, and bends it forward. Bending

forward, backward, and to the sides while all of the muscles are held rigid will straighten out some of the curve.

VERTICAL LINE TEST

Above the line of the hips the spinal column points in three directions. In the region of the abdomen the direction is forward; in the region of the chest it is backward; in the region of the neck it is again forward. This zigzag line crosses and recrosses the vertical line.

When a person stands properly a line dropped vertically from just in front of the ear will fall just behind the ball of the foot. It is the vertical line. This line passes in front of the shoulders, a little in front of the hip joint, just behind the kneecap, in front of the knee joint proper and in front of the ankles.

Fig. 442.—Normal Chest with Ribs Running Normally. (Herb.)

Let one stand a curtain pole vertically on the floor and then take his position by the side of it. The outside of the shoe two inches back of the tip of the toe should be placed against the pole. When one is standing properly the pole will run just in front of the ear.

This is an easy way to establish the vertical line. The method is called by Bancroft the vertical line test. This is the gravity line.

In a person who stands properly the abdomen will not pouch much in front of this line and the back will not push much behind it for if the spine curves much in one direction the balance is maintained by overcurvatures in other regions and in other directions. The muscles holding the body in the upright position are on the back—on the back of the calf, on the back of the thigh, on the back of the trunk and on the back of the neck. These muscles are strong. They could hold the body up even though it were out of plumb, even though it projected forward.

Fig. 443.—Ribs Running More Nearly Perpendicular in a Poorly Developed Chest and Sagging Abdomen. (Herb.)

The head might be thrown forward and the chin might droop but the muscles of the back of the neck would be under constant strain and neck pains, aches and tires would develop early.

The shoulders might droop forward unduly and the individual not fall but it would be because the muscles of the back were always pulling hard enough to offset and that means aches, pains, and tire.

If, on the other hand, the poise is right mechanically the work of these back muscles is reduced to the minimum.

Incorrect position spells inefficiency. It spells vague aches and pains. It spells exaggerated spinal curves with cramping of vital organs.

Stoop-Shouldered Girl.—*J. H. N. writes: "Our daughter, 16 years of age, is developing a bad case of stooped shoulder and hollow chest. We have endeavored to correct this by calling her attention to the results that may be expected if she does not get over the stooping habit. Can you suggest some remedy for this?"*

REPLY.—To chide her will do no good. To put braces on her will be just as useless. She is narrow chested and her shoulders slide forward on her strongly arched ribs. She probably sways the lower part of her back too far forward which makes her upper back arch backward too much.

Some months ago I wrote of an orthopedic surgeon who, by a series of manipulations and exercises, developed the muscles necessary to pull the

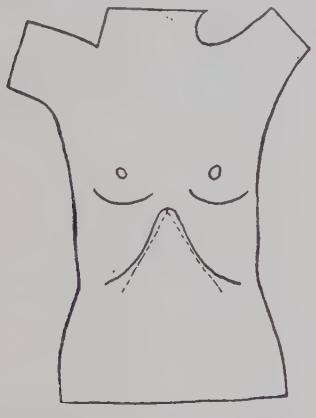


FIG. 444.—NORMAL ANGLE OF RIBS IN FRONT OF CHEST. NORMAL WELL DEVELOPED CHEST. (Herb.)

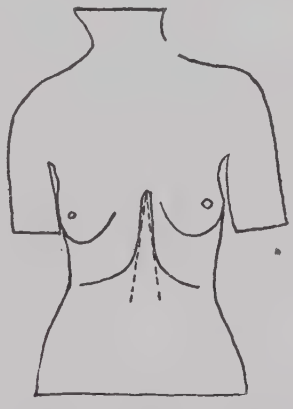


FIG. 445.—NARROW ANGLE OF RIBS IN FRONT OF CHEST. POORLY DEVELOPED CHEST. A VERY POOR SIGN. (Herb.)

excess out of the spine curves and develop the back muscles needed to hold the shoulders in place. Or it can be done by exercise.

If she takes up this work in a gymnasium she must keep it up until her back is straight and the back muscles are big and strong.

Round Shoulders.—*A. W. E. writes: "Can you recommend a shoulder brace for straightening round shoulders and advise me as to its cost?"*

REPLY.—Exercise is a better shoulder straightener than braces. Mosher says that the way to throw the shoulders back is to drop the front of the pelvis—in the case of a woman for her to stand so that the front of her dress hangs low. Mosher's observation has been that this necessarily takes the curve out of the back. Some cases of stoop shoulders are due to narrowness of the chest. In such a chest the flat shoulder blades pitch forward and their back edges stick out like wings. The point to all of this is that the shoulders naturally fall into the easiest position. Therefore to correct stoop shoulders it is necessary to correct the body curves or the narrow chest or the position at work, one of which is responsible for the stoop. Ordinary braces built on the suspenders principle cost but little more than suspenders and help some. The wise thing to do is to go to a gymnasium and find the underlying cause and work to remedy that.

Stoop Shoulders.—*W. wants to know:*

1. What is the danger in allowing young people to become stoop-shouldered?

2. How may the evil be corrected?

3. Are the ordinary shoulder braces practical?

4. Is a cold shower or a cold plunge, followed by a vigorous rub, good on a winter morning?

Reply.—1. There is not much danger. The type of chest most liable to develop consumption is the narrow chest which results from arrested development. Stoop shoulders are undesirable, decrease efficiency and do harm in some other ways.

2. Gymnastics and exercise persisted in for a long time; avoidance of incorrect posture and occupations which cause it.

3. They are of little service. The proper plan is to straighten the spinal column by properly developed muscles and by habitually keeping the position right.

4. Yes. For those strong enough to react well.

HEIGHT

One's height is largely determined by inheritance. In regard to inheritance one must remember that influence on the germ plasm extends "even unto the third and fourth generations." Possibly also children can be made to grow larger by the use of internal glandular secretions but that fact is not fully determined in the first place and in the second the substances are too powerful to use except under close medical control.

Any number of experiments with school children have proved that good feeding in childhood will add somewhat to the height. In fact, the great school feeding movements in Germany and England were based on this principle.

Examinations for the armies of those countries disclosed an awful percentage of runts and misfits. Those nations flew into a panic, appointed investigating commissions and as one of the results began school feeding.

We are pretty generally agreed with Bryant that "chronic underfeeding or incorrect feeding is shown in the child by constant failure to come up to the average of weight and height, lung capacity, grip, etc."

Something can be added to the stature by standing straight. Bancroft has measured pupils who showed a difference in total height of one to three inches brought about by change from bad to good posture. Goldthwaite, by regulating the sway in the back, increased the height from one-half to three-quarters of an inch.

About the only curve in a baby's back is in the chest region. When the head is held up the neck curve starts. When the baby begins to sit up the back curve begins to show in a few positions.

During kindergarten years the back is straight. Up to nine years of age the back of a standing child is straight. When the child has reached twelve to fifteen the hollow in the back is much more pronounced.

It is about this period that more or less steady variations from the normal curves begin to show themselves.

During the grammar grades the heart more than doubles in weight, the lungs treble and the liver doubles. Bancroft says these heavy organs are growing most rapidly when the child is from twelve to fifteen years old, while Donaldson says the muscular system is not growing at its best for several years thereafter. Therefore, the heavy organs are liable to overcurve the spine in these years of muscular weakness.

The suggestion is that children be encouraged to play and to exercise judiciously. The regulated exercises are advised from the eighth year on. Such exercises as develop proper curves and prevent the development of overcurves add to the height.

INCREASING THE HEIGHT

I receive a good many letters from people who want to grow taller. While a part of this interest has been stimulated by advertisements in the main these advertisements have merely served to convert a vague desire into a moving impulse.

A man "by taking thought can add a cubit to his stature." At least he can add a fraction of an inch.

Many years ago it was noted that when the thyroid gland was removed from a young animal its bony growth was stunted and that feeding thyroid to young animals stimulated their bony growth. From this it was concluded that when young animals (including the human) were fed thyroid they would grow taller than their inheritance would lead one to expect. But this drug is too powerful for general use and it is doubtful if it helps much anyhow.

The real secret of gaining a fraction of an inch in height is to take the curves out of the backbone. Some of the backbone curves are caused by tuberculosis of the bone. These cannot be straightened much. But ewe neck, stoop shoulders, and occupation stoops can be straightened out—the kind you read about in Eugene Sue's "Mysteries of Paris"—the kind you see about you on every hand. By proper, persistent muscle training these can be straightened out and the subject will grow taller in consequence.

1. As Ritchie says—"Stand tall, thrusting up the top of the head as high as possible and drawing the abdomen and chin in is the best rule for position in standing and walking."

2. Spend some time each day pulling hard on all those muscles which pull the backbone straight. (Never mind the names of them.) Experiment until you find just what pull straightens you. You can feel the muscles contract. Having found yourself, each day make a few good, hard, tense pulls with the "pullers" which you have discovered. In this the setting-up exercises of the soldier are excellent aids. A good one is to bend forward until the fingers touch the toes or knees and then to straighten up. This should be done with the opposing muscles resisting hard.

Are we getting taller or shorter, larger or smaller? I have heard men bewail the rareness of the tall, broad, brawny men of the old rail-splitter type and the abundance of little runty fellows. As a matter of fact, these opinions are without basis. The element of immigration makes conclusion from observation almost impossible in this country. Where the increase in popu-

lation is mostly due to immigration, where over 9,000,000 immigrants (mostly adult males) come into a population of 90,000,000 in ten years their influence is felt. If a large part of them were Patagonian giants the onlooker might think the race was growing larger. On the other hand, a certain proportion from the African pigmy tribes might make one pessimistic.

Hansen of Copenhagen gave the Eugenics Congress the results of comparative measurements of certain peoples in Europe. Their populations being more stable than ours conclusions from measurements are much more dependable.

By way of a general conclusion, he says:

"In many European populations, the most obvious racial quality of all, the stature, has in the last fifty years or more, undergone a very sensible improvement, having increased by as much as two inches or more."

A comparison of the boys fourteen to fifteen years old, at Marlborough college in England 1874-78, with those there at 1899-1902, showed an average increase of .56 inch. In the last fifty years the height of the average grown Dane increased 1.4 inches. Hansen says the Swedes and Norwegians have increased about as rapidly as the Danes. Certain measurements of the Dutch made in 1866, 1883 and 1899 showed a total gain of a little over an inch. Bolk says in fifty years the Netherlanders increased their average height four inches. He thinks this gain is too great to have been wholly the result of improved conditions but that fifty years ago the Netherlanders were passing through hard times and that they are now returning to their normal condition.

Pearson gives the average weight in England of boy babies at birth as 7.3 pounds, girls about a quarter-pound less. In twenty years the average weight of British boys at birth increased 1,262 grams, nearly three ounces; girls, 908 grams, nearly two ounces. In Denmark the increase in thirty-five years was 600 grams. Observations made on school children show that there is a gradual gain in weight, height and chest measure.

Hansen says: "It is permissible to believe that the increase of stature during the school age is a great deal due to the progress of school hygiene. The development of all kinds of bodily exercise that has taken place in the last decade must have had a considerable influence on the growth of the children."

LONG-BODIED PEOPLE

The "folks" on the farm hold that it is bad policy to buy a horse that "shows too much daylight under the belly." It may be too long-legged, or if it stands spraddled out it will not be strong and active in proportion to its weight and muscle.

If it is too long bodied it will be too hard to keep. It will require too much feed for the work it does.

Men lose in efficiency and in effective use of food by being too long-legged and too long-bodied.

Another horse sign is too much space from the last rib to the hip bone. This means that the animal will require much feed.

The height of man is due to the length of leg plus the length of body plus the length of neck plus the depth of the head from crown to neck. From the standpoint of vitality what counts is the length of the trunk—the height of

the person when sitting. To be still more accurate, that which counts is the height of the collar line when the person is sitting.

Length of legs is especially serviceable in the doing of a few things. Length of trunk is especially serviceable in the great majority of life functions. Tyler tells us that "during the first three years the legs grow one-third more than the trunk; from the third to the sixth year of age they grow almost half again as fast as the trunk; from the sixth to the ninth year the legs grow proportionately three-fourths more than the trunk; and from the twelfth to the fifteenth more than half as much. After the fifteenth year the trunk grows faster than the legs."

A baby is long-bodied and short-legged. A grown person is long-legged and short-bodied. His legs are about as long as his body, neck and head combined. His center of gravity, as Reynolds and Lovett show, is about his hips. His legs and feet weigh about as much as all the balance of his body combined.

There is a disadvantage in a short trunk which, in the horse, is held to be an advantage. Short-bodied people are prone to lay on fat. As a horse is on an economic basis a tendency to lay on fat is an advantage. A short-bodied horse which will do a hard day's muscular work and keep in prime condition on a small allowance of oats is a desirable animal to have in the barn.

Man is not an economic basis. He does not do muscular work. His brain has lifted him out of that class and each year finds for him still other means of escape. He wants to eat overmuch and not get overfat.

If he is short-trunked he cannot do it. If he measures far from his last rib to his hips he is reasonably certain to fatten up as he passes from youth into middle life.

The men with endurance and vitality are those with long trunks, those that "sit high." They are the men who can work hard and long and keep it up for successive days, months, and years—that is, assuming that there is breadth of shoulder along with length of trunk.

They have chest room for well developed hearts and lungs. They have abdomen room for completing the processes of digestion and preparation of food for proper use by the tissues. Storing food as fat is not proper use by the tissues.

Wants to Increase Height.—*M. E. W. writes: "Can you suggest any exercise that will tend to develop the height?"*

Reply.—Height is much more a question of inheritance than exercise. The bones attain their growth early in life. Therefore, exercise and feeding, to influence stature, must be made use of in youth.

Abundant feeding and good hygiene in childhood and in youth can lend a helping hand to heredity. A part of an inch can be gained by the use of such exercises as tend to straighten out sway backs, stoop shoulders, ewe necks, and similar faults in posture. A few years ago dried thyroid, persisted in for years in youth, was thought to have some value.

Exercises to correct posture and thus increase stature are not of much service except under the guidance of a physical culture expert.

Will Not Grow.—*L. writes: "I am a woman of 21, and should like to add two inches to my height. Will thyroid tablets do this?"*

REPLY.—If you are twenty-one you will not gain in height from using thyroid. Competently directed youths in their teens might be justified in trying it.

Rules for Height.—*J. S. writes: "Is it possible for me to increase my height about two inches by means of stretching exercises, after I have reached the age of 23, without impairing my health? If so, what exercise would you recommend?"*

REPLY.—Follow the exercises issued by Sudor for use in the Chicago public schools. By standing straight you can increase your height, but not so much as two inches.

How to Grow Taller.—*J. H. J. writes: "Could you tell me something to make me grow taller?"*

REPLY.—There is nothing to do but to eat plenty of meat, bread, vegetables and fruit. Exercise a lot and stand straight. Some day physicians may be able to increase stature by using the ductless glands but the plan has not yet been worked out.

To Increase Height.—*F. S. M. S. writes: "Can the stature of a person 19 years of age be increased by stretching the cartilage between the bones? If so, how much of an increase can be had? Are there any harmful effects caused by using this method?"*

REPLY.—By standing straight and thus lessening the curves you can increase your height somewhere near an inch. It is not stretching the cartilages that brings about the result. The treatment is harmless; in fact, it is beneficial. Do not waste money on expensively advertised systems. Work in a properly directed gymnasium will do as much for you.

CHAPTER LVIII

The Muscles

The tissues of the human body are divided into hard workers such as brain, kidney and muscle, and those which merely stand and serve such as bone and fat.

Of the workers, the muscles comprise the largest part. Their weight is 65 per cent of the body weight, after the bone weight has been subtracted. They do more than 65 per cent of the work. The brain sleeps but the heart and breathing muscles work on through the resting hours.

The most important reason for eating is that the muscles may have food; for breathing, that they may have air. If the muscles are burning up food properly the stomach will take care of itself.

The real reason of dyspepsia and indigestion is in the muscles. The place where food is burned into waste is not in the kidneys or the liver but in the muscles. The kidneys and the liver merely eliminate the ashes as the lungs eliminate the smoke.

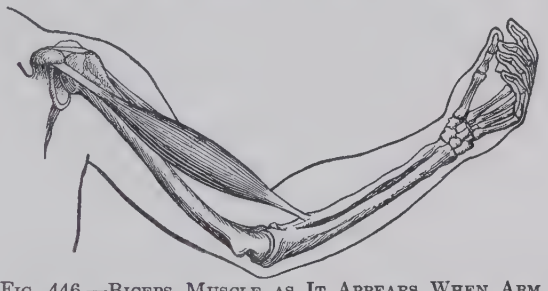


Fig. 446.—Biceps Muscle as It Appears When Arm Is Extended.

Muscle movement squeezes juices rich in waste products out of the tissue spaces and into the blood vessels where circulation is more active.

Flabby, soft muscles mean several things. In the first place, they mean that 65 per cent of the man is not much man—is in a poor state of vigor. Besides that they mean poor breathing, poor burning up of waste, clogged elimination all over his body, a certain amount of lowered resistance and premature senility.

Every man needs muscular exercise. No man's work gives all his muscles the needed exercise. About nine-tenths of the men are engaged in work requiring physical labor yet these too require some form of play to exercise muscles unused in their work, to empty the dead ends of their sewers—for such are inactive muscles.

Properly planned play after the day's work is done is restful to the mind and the body. As to housewives, brain workers, clerks and office workers, there is no need of arguing that their muscles are flabby, their circulation poor, their digestion troublesome, their biliousness frequent, and that these call for better muscular development.

Every flabby person is willing to admit that he ought to take more exercise but systems take time and apparatus. Some of them would build up

their muscles if it could be done without apparatus or without going to a gymnasium.

Let them get busy for to build up muscles it is not necessary to have apparatus or to go to any gymnasium or to take lessons from any physical culture professor or to use up any particular time. One can be a home-made Sandow.

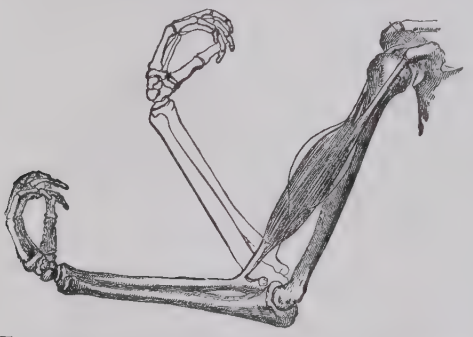


Fig. 447.—The Bones of the Upper Extremity with Biceps Muscle.

The plan which has been proposed any number of times is that instead of lifting a weight or chinning a bar the lifting be done against opposing muscles. Nowhere in the body is there a group of muscles that works unopposed. Universally whenever there is a group of muscles that pull in one direction there is another group which pull opposite. The simplest and best plan to develop the muscles is to use the pull of one group against the other.

The man who is exercising according to this plan should go over his body systematically at least once every day.

Step one is to pick out in the mind a group of muscles to be exercised. Step two is to move the part selected by pulling on one group of muscles and pulling against that group with the opposing group. Repeat this three times.

For this it is not necessary to know the names of the muscles. The motion having been decided on experience teaches just what muscles are to be used to accomplish it.

Having gone over the face muscles next go over those of the neck. For instance, draw the head back pulling it violently with the muscles of the back of the neck and pulling violently against these with the muscles of the front. Exercise all the muscles of the neck by pulling hard and slowly with each group opposed by a hard pull from each opposite.

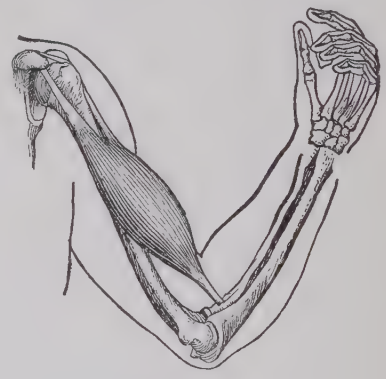


Fig. 448.—Biceps Muscle as It Appears When Arm Is Bent.

The hands, wrists, forearms and arms, legs, chest, back, and abdominal muscles are gone over in the same systematic way.

Five minutes in the bathroom in the morning while one dresses, and five minutes as one undresses at night will be all that is needed for the home part of the plan.

Following it, within a week one can pick out any muscle and exercise it and one can squeeze out as much waste from his biceps by bending his elbow with the triceps pulling opposite as he can by lifting a bag of shot.

The best part of the plan, however, is that as soon as one gets going he does not have to bend his limbs to get the exercise or to do anything else that attracts attention. As one rides in the street car or automobile, sits at his desk or does anything else which does not occupy all his mental energy he can throw his muscles into tension without moving or giving any outward sign.

Let the man who goes home from work in the afternoon loggy and heavy — perhaps suffering from a headache — systematically pick out and contract all the muscles of his abdomen and back. He will not only gain for himself a muscle control that will keep his belly flat but he will flush out the waste of peripheral tissues, cause himself to breathe deeper, to think more clearly and to resist infection better.

Following this very simple plan for ten minutes in the bathroom at home and from time to time during the day a man can build up muscle lumps that will compare favorably with the pictures in the street cars.

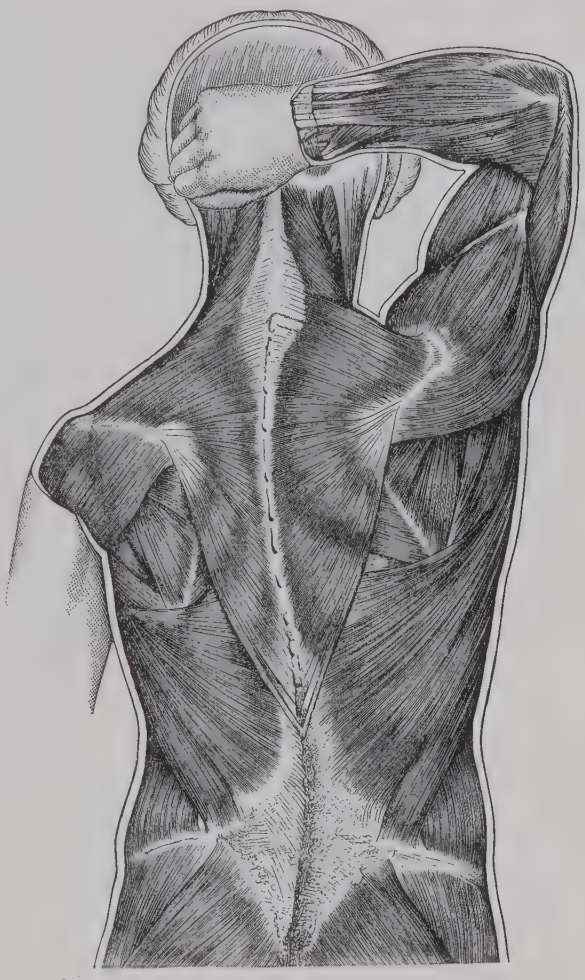


Fig. 449.—Great Muscles of the Back, Neck and Arm.

If the advice were stopped at this point this article would do more harm than good. Muscle building is not enough. Muscle training is of importance. A muscle building system must be supplemented by a muscle training system and this last calls for play of some sort.

The big-muscled fellows are not in very good condition. Many of them die from consumption and pneumonia. They do not live long; they never are good prize fighters or wrestlers; they never win any running races; they are never golf champions; they are never good billiard players or bowlers; nor do they win any games at tennis.

Everyone needs some play out of doors. There is genuine physical need of the freshness of the open air in sunshine and in storm. One needs differences in temperature—to breathe deeply of fresh air—to have the wind and rain beat in the face—to have the heart beat fast—to have the skin red from blood in the capillaries—to sweat.

Fig. 450.—Various Types of Striped or Voluntary Muscles.

Add to the above program for "auto-muscular" development some exercise in the open air such as walking to and from the office or even climbing stairs instead of using the elevators.

Striking a golf ball is a wonderful act. For it at least fifty muscles are required. Each must do just exactly its work, no more, no less. It must do its work at just exactly the right time—neither too soon nor too late. Each must do its work in proportion to the work done by each other member of the force. If any one lags or fails to do its share some other must compensate in one way or another.

A bowler sends a ball down the alley with just the right speed and aimed to strike the front pin at just the right place. In order to do this he makes use of almost every muscle in his body. Each does exactly the right amount of work in the right way and at the right time.

If a railroad system were as complicated as the act of bowling train dispatchers would score "strikes" and "spares" less frequently than do bowlers. Muscle coördination is wonderful and well worthy of development.

Play builds up long, lithe, quick acting, trained muscles. In addition to that it burns up the fuel of the body completely instead of halfway. It therefore is an aid to digestion. It uses up gases; it therefore is an aid in breathing. It squeezes the waste out of the by-places. It therefore helps the organs of excretion. It teaches coöperation, coördination and community life.

As muscles work they make fatigue toxins. These toxins stimulate the formation of fatigue antitoxins—a way in which play rests those tired from hard work.

Ten minutes a day is not enough time to give the muscles; but not all days are fit for play. Then let one devote a few minutes each day to a system of muscle development and add to it training of coördination through play as often as it can be made to fit into the program of work.

We may not agree with Friedman that we are breeding a race of people with big minds and little bodies. We may not agree with the statement attributed to Wellington that Waterloo was won on the cricket field. But we can all agree that average men, those with good (not big) muscles well trained, are healthy animals, and that good playing in that it teaches working together by healthy men makes good citizens.

LEG AND ARM MUSCLES

The fingers, hand and wrist are moved by the muscles below the elbow in the arm and those in the hand. The movements of the hand muscles are of two kinds: closing the fist and opening it; of the forearm muscles, bending the hand forward and backward, bending it to the thumb side and in the opposite direction. In addition the hand can be rolled so that the palm faces up and turned so that it faces down.

Here are six movements, three groups of two each. Here are six groups of muscles, three groups of two each.

To build up these muscles there are six exercises.

1. Close the fist by pulling hard with the palm muscles, pulling against these with the muscles of the back of the hand and arm.

2. Open the fist, antagonizing the same groups.

3. Move the hand toward the thumb side, pulling hard on the opposing muscles.

4. Move the hand toward the little finger side, pulling hard on the opposite group.

5. Roll the palm up while pulling hard on the muscles which roll it down.

6. Roll the palm down while pulling hard on the opposing muscles.

To exercise the muscles which move the elbow is simpler still. There

are but two groups: Those on the front which crook the elbow and those on the back which straighten it. The exercises are but two.

1. Crook the elbow by pulling hard with the muscles on the front of the arm, pulling against them with the muscles on the back.

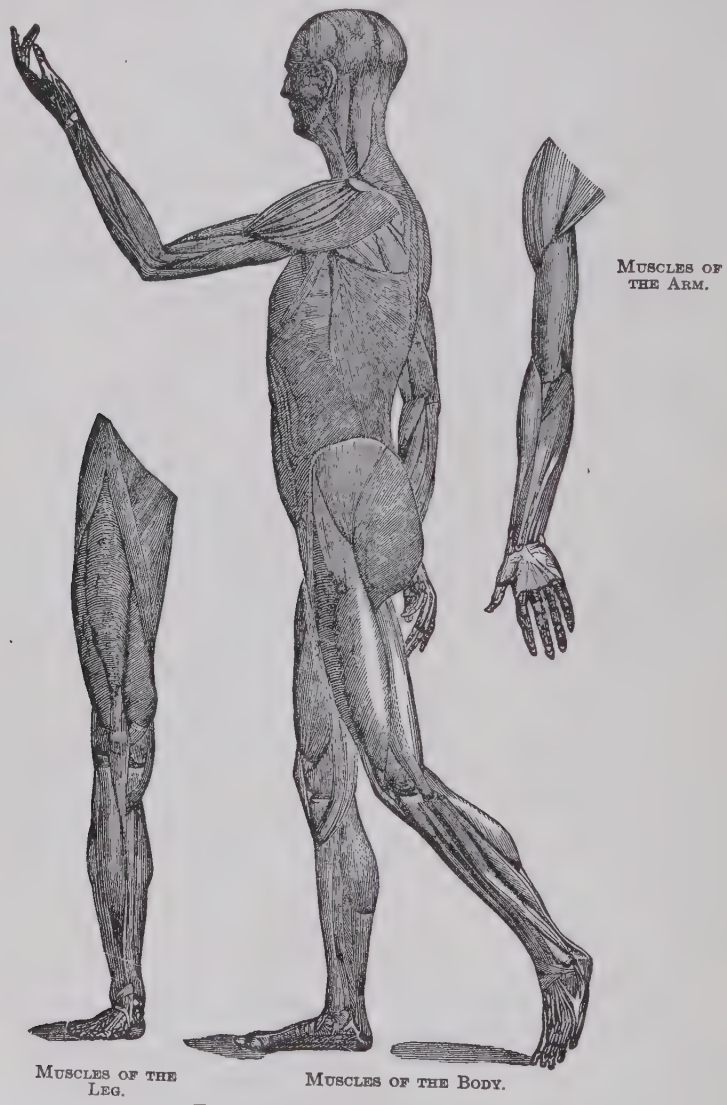


Fig. 451.—Muscles.

2. Straighten the elbow by using the muscles on the back of the arm to outpull those on the front.

The shoulder is lifted upward by the neck muscles and pulled downward, forward, and backward by the chest muscles. It should be successively pulled in each direction by having the muscles in each group outpull its opposing group.

The leg muscles, including those of the feet and toes, are to be exercised in the same way. Ten minutes a day given to leg and arm exercises will keep these muscles in fine tone, will increase their size and will give the brain increased control of them.

It will not teach rapid or properly controlled use of them. That is another story.

MUSCLE SAGGING

The organs work best when they are where nature put them. Because this is so there are arrangements of bones, ligaments, and muscles to hold them in their proper places. No organ is wedged in immovably tight. Every organ is so arranged as to permit of a little play. Such an arrangement permitting of a little play is necessary to save wear and tear. An immovable timber in the midst of movable water wears out and breaks up much more quickly than one that gives a little with every wave. Therefore, whenever there are pleuritic adhesions which fix the lungs from pleurisy, pleurisy pains are frequently felt.

Whenever any organ is firmly fixed in one position "hurts and aches" in that organ will be frequent. But the amount of movement in so-called "fixed" organs must be but slight. An exaggerated movability is worse than too much rigidity. Above all does harm come from a markedly persistent sagging.

Any of the structures whose duty it is to hold organs in place may get out of place or fail to do their work for other reasons, but the muscles are usually the worst offenders.

The organs of the abdomen are held in a box. At the top is the chest; there cannot be give in that direction. At the bottom is the bony pelvis; there is not much chance to give in that direction. Behind are the spinal column and the heavy back muscles; there can be no pouching backward.

The front is the weak area. Those muscles are not overstrong in muscular people while they are exceedingly weak in flabby folk. To make matters worse, the backward bend of the lower back pitches the strain against the front. The weak muscles give; they pouch out; they pot and into the pot the stomach, intestines and liver sag. Sagging of the organs is called ptosis by the doctors.

Ptosis is important because it produces intestinal stasis and intestinal stasis in turn leads to a great variety of diseases and disabling conditions not called diseases.

In intestinal stasis the intestines do not pass the food along so rapidly as it should be passed. Where such a condition is present nutrition is materially interfered with, resistance lowered, and the system exposed to attack by disease producing germs.

To Metchnikoff and Lane much credit is due for working out the harm done by intestinal stasis. Where intestinal stasis exists the organs of elimination—kidneys and bowels—are unable to throw off the waste products. The system becomes clogged up.

It takes the food about six hours to pass through the stomach and small intestine. It takes it about forty hours to get through the eight feet of large intestine. At best the large intestine has its trouble preventing its contents

from stagnating and when it sags or kinks the movement of the contents is more difficult; stagnation is more frequent and stagnation effects are more harmful.

Metchnikoff says: "Particularly injurious are the microbes of the large intestine. Thence they penetrate into the blood and impair it alike by their presence and the products they yield—ptomaines, alkaloids, and the like. The auto-intoxication of the organism and poisoning through microbes are an established fact."

Metchnikoff's theory is that the arterial changes which cause many of the diseases of old age are due to bacteria in the intestines. He says that the poisons generated by these intestinal bacteria are the cause of the common diseases of degeneration of the organs of the human body and the chief cause of premature old age; that if we could preserve the intestinal tract in a state of freedom from intestinal bacteria we could prevent most of the diseases that can be traced to the action of these germs, including chronic heart disease, arteriosclerosis and most kinds of headaches. Not only that but we could greatly prolong life because the greatest cause of old age, the absorption of bacterial poisons in the intestines, would be nonexistent.

The process of tearing down and building up is going on in the body all the time. Waste which results from this process should be promptly removed if the individual is to enjoy good health. To carry away the waste product nature has provided us with lungs, kidneys and bowels—the latter being by far the most important as they have so much more work to do.

The retention of waste products affects the system by undergoing changes which produce gas and various forms of disease-producing germs. These products of fermentation and decomposition are harmful in two ways.

1. The gaseous condition causes distress particularly when present in the colon. On account of the size of the colon, when it becomes distended with gas it crowds the neighboring organs. It may even irritate them and if greatly overdistended interfere not only with its own function but with those of its neighbors. Many times when the irritation is of sufficient degree, if prolonged it may excite inflammation in the neighboring organs.

2. They are harmful in that the poisons which result therefrom so frequently get out into the blood current and produce a train of symptoms which are not always easily classified.

Where the colon is overdistended and full of gas it may materially interfere with stomach digestion. It may interfere with the free and easy movement of the food in the stomach and even cause undue retention. It is this interference with the normal disposition of the food once it has arrived in the stomach, that produces such distressing symptoms of stomach indigestion.

The chief source of danger resulting from the accumulation of products of decomposition and fermentation in the bowels and stomach is absorption. When large quantities of poisonous materials result therefrom much of it is likely to get through the walls of the intestines into the blood current and materially interfere with nutrition to the part.

The colon particularly has great absorbing powers. For this reason when decomposition of organic substances (comprising food) occurs in the colon the products are rapidly absorbed and borne away by the blood to

all parts of the body, to be brought in contact with the tissues to their serious injury. Thus the kidneys, lungs, nerves, arteries, in fact all the organs in the body, undergo a change which diminishes their vitality and resisting power.

While it is accepted that most diseases are of germ origin it should not be forgotten that lowered physical resistance and loss of vitality have much to do with preparing a field in which the particular germ may lodge and set up its particular type of disease.

A certain germ may lodge in the crypts of the tonsils, may remain there indefinitely and do no harm. If, however, its environment should be changed so as to reinvigorate it and give it new life it may immediately get into the blood current, be carried to some remote joint, lodge there, and cause a train of symptoms of a rheumatic type. It may pass out into the muscular structures and lodge producing a muscular rheumatism. It may produce other diseases.

If, however, the system had not become so changed that the germ was given a renewed vitality it might have remained in its original lodging place and have done no harm.

Dr. Franklin H. Martin considers ptosis responsible for the kinks in the lower end of the small intestine, the lower end of the stomach, cystic duct of the gall bladder, transverse colon and in other portions of the large bowel.

When sharp kinks in the various abdominal viscera are subjected to prolonged mechanical irritation and inflammation it happens sometimes that strong fibrous adhesive bands fix the organs in unnatural positions or fix the unnatural kinks.

Such adhesions may produce a long line of symptoms often vague. These have been worked out and described in simple language by various writers. None, however, has expressed them more systematically than Mr. Chapple. He made a study of a number of cases and found the symptoms complained of by most of them about as follows:

1. Headaches, severe and frequent.

2. Attacks of nausea often followed by retching or actual vomiting. In some cases the vomiting was frequent indeed and of a severe nature. It was interesting to note that in several of the cases blood was frequently present in the vomit and had led able men to the diagnosis of gastric ulcer although none such was found in the operation.

3. Loss of appetite was almost constantly present.

4. Loss of weight was present in all cases.

5. Markedly cold hands and feet, which gave an indication of defective circulation.

6. Mental apathy. This was definite in most cases. Many felt that death would be a welcome relief from their physical and mental misery and two had actually attempted to bring about that end.

7. Constipation, which in all was persistent and its previous treatment a failure. One case had gone on several occasions for twenty-eight days without an action of her bowels, in spite of treatment.

8. Attacks of abdominal distension due to gas.

9. General muscular pain and a loss of freedom in the action of the joints.

People whose abdominal organs had sagged, particularly those in whom sagging had caused kinks which had later become fixed, generally had a sallow skin. In many were the so-called liver spots. In some there were brownish patches under the arms and in the groin.

The farther from the stomach the intestinal kink was located the deeper the color of the patch and the larger it was.

The people who have been going to beauty specialists for liver spots should have been hitching up their abdominal organs.

In some cases not much can be done in the cure of ptosis and stasis by building up the muscles, until the adhesions have been broken up by operation. Breaking up of adhesions by operation may require more than one operation.

Following the breaking up of adhesions and the reduction of misplaced organs to their normal positions active muscular exercises and massage may be employed to build up the muscles of the walls of the abdomen, chest and back. These are the muscles that need especial care and training in the treatment of ptosis.

Dr. Martin has proposed a plan of exercises to develop these muscles. These exercises consist in placing one end of an ordinary ironing board or board of about similar dimensions on a chair, allowing the other end to rest on the floor. The patient is then required to lie down on the board with the head downwards. This position of the body permits the gravitation of the viscera upward under the border of the ribs.

While in this position the patient is required to practice active exercises by flexing the lower leg on the thigh and the thigh on the abdomen.

Dr. Martin also recommends deep breathing exercises. These are to be practised while the body is in the same position as when taking the muscular exercises.

1. Place both hands on the lower abdomen towards the diaphragm.
2. Elevate the shoulders with arms extended slowly at right angles to the side.
3. Elevate the arms above the head perpendicular to the body.

By practicing these exercises one brings into play the diaphragm, the abdominal muscles, the back muscles, the muscles which raise and lower the ribs, the shoulder muscles, the strong muscles over the front of the chest, those of the back covering the shoulder blades and even the muscles about the neck.

Walking Will Help.—*M. H. wants to know if the muscles can be exercised without moving the joints. He has no time to play golf or any other game. He has lived in the country and got plenty of exercise there but does not have any chance in the city. He has tried exercising his muscles as he sits at his work but does not know that he does it right.*

Reply.—Yes, the muscles can be exercised without moving the joints. Take, for example, your hand. You can tighten each group of muscles without bending a finger. You know that you have exercised them because you can see and feel them contract. With a little practice you can do the same with the muscles everywhere. Facility in picking out muscles and in exercising them can be acquired without having set

exercises and a set time to do them in. At the same time this does not take the place of play or exercise in the open air. I wonder if you walk to and from your work or two miles of the distance riding the remainder, or if you walk up and down stairs.

Deep Breathing Benefits.—*C. B. Q. writes: "1. What, please, is the benefit of taking deep inspirations? 2. Does the practice of holding the breath for a minute or longer do one's lungs any material good?"*

REPLY.—1. The breathing automatically regulates itself. We breathe as often and as deeply as we need to to get rid of the gaseous wastes of the body and to provide the blood with oxygen.

Deep breathing for a short while drives the blood out of the lungs and into the circulation. It is a great quickener of capillary circulation. It is an excellent means of overcoming drowsiness and cold feet. It is a means of exercising the trunk muscles, especially the accessory respiration muscles. It has some effects in ridding the body of carbonic acid and increasing the oxygen in the blood.

2. No.

Arm Muscles Exercise.—*M. B. says that she does not know how to go about making one set of muscles pull against another. For example, how could she exercise her lower arm muscles?*

REPLY.—Take a brick in your hand. Lay your arm on a table, holding the brick in your hand. Keeping the elbow on the table, raise the brick slowly until it is one foot above the table. Slowly lower it. Now go through the same movement without the brick using about the same amount of muscle pull as when you held it.

Cramps While Swimming.—*F. K. L. writes: "Every time I go in swimming I get a cramp in the arch of my left foot. What causes it, and what will prevent it?"*

REPLY.—It is caused by a combination of unusual exercises, cold, and apprehension.

To prevent it: (a) Exercise every morning in your bathroom; perform exercises that make use of your leg muscles. (b) Exercise when nude in a cold bathroom. (c) Quiet your apprehension; to fear cramps is to invite them.

CHAPTER LIX

Housing

Charles Dickens said: "I have systematically tried to turn fiction to the good account of showing the preventable wretchedness and misery in which the masses of the people dwell and of expressing again and again the conviction, founded upon observation, that the reform of their habitations must precede all other reforms, and that without it all other reforms must fail."

WHERE SHALL ONE LIVE?

Many people move on October 1. The October crop of movers is next in size to the May crop.

What do they look for? They consider transportation, accessibility, the neighborhood, the general appearance of the house, the front entrance, the parlor, the bathroom, the kitchen conveniences and the price. This is about as much as the average house hunter goes into it. No one of these considerations should be lost sight of. They are immensely important.

Important though they are, they should not be the only things thought of. Whether the house is a healthy place to live in is very much more important.

Houses are built of brick and stone. Health is not built in. The man who builds is not thinking of that. He was not thinking of it when he bought his lot. So when the house hunter goes around with health as one of his yardsticks he does not find much that measures up.

The employed members of the family are going to be in the house about twelve hours out of the twenty-four; the school children somewhat more than that; the younger children and the housewife will be there for twenty hours out of the day's total.

A healthy home is highly important. It is important in shielding against definite disease. It is more important in making for efficiency. What we mean is this: It is more important that a man should go to his work or that the child should go to his study bright, clear and vigorous, well rested and overflowing with life, than it is that they should be protected from particular diseases.

I am going to write about some things in a house which are more important than the front entrance.

HOUSES AND HOUSING

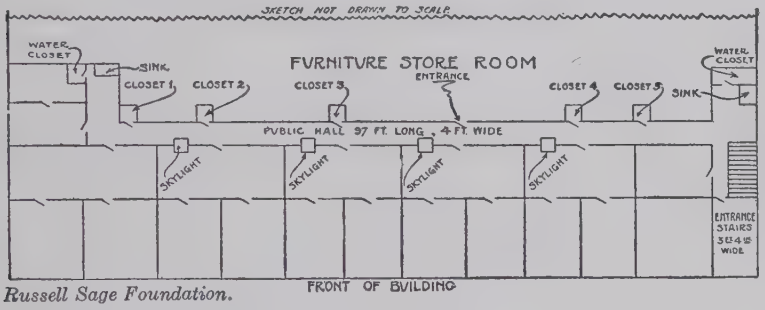
Houses are one thing; housing is another. Houses may be all right; the housing may be poor. The housing is what counts; the house is of

secondary importance. Improving the houses may make the housing worse. In fact, it usually does. With us it certainly will. Why? Because we have our minds set on houses. It is the common experience that even when a housing situation is tinkered with just enough to improve the houses the housing is made worse.

It is a basic law that rent cannot take more than 25 per cent of the family income. Generally it takes less. If the family is one of low standards it will not allow the proportion to get to 20 per cent, or anywhere near it.

If the rent goes up the family moves to a cheaper place or it takes lodgers or the women and children go to work—which means that when the rent goes up the housing goes down. To improve the houses puts the rent up; therefore it puts the housing down. There are too many experiences demonstrating the working of this rule to leave it in doubt.

When we require larger rooms, more windows, more of the lot un-



Russell Sage Foundation.

FIG. 452.—DIAGRAM OF A BAD TENEMENT IN SPRINGFIELD, ILL.

occupied, better construction, better plumbing, we increase the rent. When we do many of the people who formerly occupied houses in that neighborhood must move into basements or into alley houses. Others will pay the greater rent but they will crowd in lodgers to make the extra money.

There must be better housing. Health demands it. Business demands it. Labor demands it. The life of the nation demands it. To have better housing we must have better houses.

Is there any way to get them without raising the rents? When you tackle that question you quit thinking.

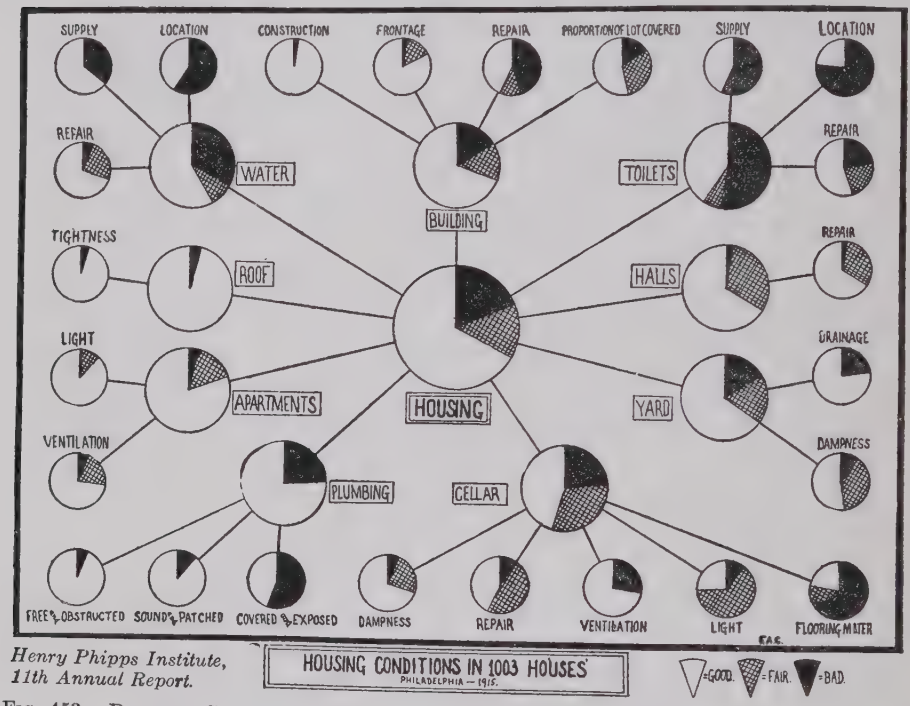
Several remedies have been proposed. One is for the government to buy up the bad housing districts, tear out the old houses, build new ones and rent those to the people. This plan is based on the idea that if all the land were used to the best advantage and all middlemen were eliminated the government could furnish a workingman a good house for the rent he now pays for a poor one.

Another is excess condemnation. By this is meant that the government would buy up all the bad housing, tear it out, rebuild, improve,—and sell back enough of the beautified, adorned and homogeneously developed land to pay for the improvements.

Another is the tax on unearned increment and use of the funds for rebuilding poor districts. The plan is for the government to get a certain part of the increase in value of privately owned land and to use the funds

so collected as a land fund. This land fund is to be collected in order to purchase poor houses, rebuild them, and rent or sell them to workingmen on easy terms.

Another is the single tax or a modification of it. Under this plan taxes are to be taken from personal property and from improvements on land. This will greatly increase the taxes on land. On unimproved property the taxes will be greatly increased. On improved real estate the tax increase



Henry Phipps Institute, 11th Annual Report.

FIG. 453.—DIAGRAM GIVING AN ANALYSIS OF CONDITIONS IN 1003 HOUSES IN PHILADELPHIA.

will not equal the reduction because of the release of the improvements from taxation. With the housing property paying less taxes the rent will be lowered, or a good house will rent for what a poor one now rents for.

There are several cures. Tinkering is not one of them. But even tinkering is better than doing nothing. *Vis inertia* is the hardest of forces to overcome in a democracy.

HOUSING PROBLEMS IN AMERICA

When the second National Conference on Housing was opened Jacob Riis was noticed in the hall and called on for a speech. He declined. On the closing day of the conference he took the platform and told his old-time friends the reason he had refused to speak on the opening day was that he wanted to size them up first.

"Let me tell you," he said, "of what I saw of you. I saw the same clear-

eyed enthusiasm that I was familiar with in the old days and with that I saw the calm confidence which knows how to go and how far it can go. That was a new thing, friends, to me. I saw a balance had come into you, a balance that was good to see. It was clear that you are no longer only determined to go ahead but that you know also how far to go and how to go, and that is a great thing."

With this speech the conference closed.

Some part of Mr. Riis' opinion is justified and some of it is not. When men first began to complain about "the horrid slums" the attitude was one of wild-eyed enthusiasm. They were for ripping out the tenements and doing many other acts born of zeal. Nobody talks that way now except the Pauls whose Saul wings were shed overnight.

It is easily apparent that men working on housing have had a "balance come into them, a balance that was good to see." In my judgment, that balance is more the result of a recognition of "how far you can go" which carries with it always the corollary "how far you cannot go," than it is knowledge of "how to go."

According to my way of estimating it, the housing workers have settled down to the work of the day. They are tackling the little problems of every day, trying to solve them as sensibly as they can; but they have no greater vision of the remedy, the great how-to-go, than they had in the rosier morning.

They seem to have accepted it as inevitable that the children of Israel must wander forty years. They have quit climbing mountains to look out for the Promised Land and are giving their thought to daily manna, camp sanitation and to the other things necessary if any of the Israelites are to be on earth when the pilgrimage is past and the Promised Land is at hand.

In this three days' discussion there were hundreds of talks on the problems that relate to housing. Seventy-six cities and twenty-three states were represented and each delegate told of things as they were where he came from.

Suggestions were occasionally made as to methods of bettering things. But at least nine-tenths of the discussion might be termed inventorying—telling of conditions, perhaps of machinery for control, perhaps of plans for the future—and yet the question, What is the remedy? remained without answer. How to go was answered by "We are trying this" or "We have tried this," but never a clear-cut answer "Thus and so."

The thread began with the admirable speech of the British ambassador, James Bryce, who struck the keynote when he said:

"I am not prepared to say what are the remedies that can be applied" [the how-to-go].

It ran to the end, for the association adopted no resolutions embodying its opinions or making any attempt to standardize procedure. Mind you, the conference was discussing the bad features of bad housing, not the fundamental underlying principles, and not even on the how-to-go of these was opinion crystallized.

Mr. Bryce gave seven reasons why a great city was a great evil. His first was as follows:

"From the point of view of health. In the city—and most of the great cities are crowded—there must be less oxygen and more microbes. I believe

it is a fact that no city has maintained itself and its standards of physical excellence without an indraught from the country. If you were to leave the city alone, stop the indraught of the people who have grown up and formed their constitutions in the air of the country, the population would decline physically and, perhaps, begin to die out."

I shall digress from the main point enough to impress the truth of Mr. Bryce's statement on the readers of this article. For instance, every year Chicago gains 15,000 population by natural increase but it gains an additional 30,000 by drawing on the country for them.

If it were not for this constant skimming of the country the city death rates would not keep down in spite of its good health department. On the other hand, were it stopped the country death rates would drop even though the state health departments remained as inactive and inefficient as many of them now are.

Ambassador Bryce said: "Instead of letting a few huge cities grow to more than a million in population it would be far better to have more and smaller cities not exceeding 150,000 population or perhaps even 100,000. This would furnish all the things that are needed for comfort and social enjoyment."

Many authorities place 250,000 as the limits of a city's population, beyond which there is loss for the city and the country at large. Thus we see that so long as Ambassador Bryce stuck to the problem everybody was agreed. When he ventured into the fringe of the remedy opinions varied.

We must not get the idea that bad housing only exists in the huge cities of a million or more. Mr. Ball of the Chicago health department has examined the housing in Washington, New York, Louisville, St. Louis, and Duluth and he tells me that their problems differ from Chicago's only in details.

Professor Tufts has made a housing survey of small cities, towns and villages in Illinois, and his testimony is that the variance is only in details.

Professors Condra and Bailey and other men who have written on rural homes and Professor Blair, who has reported on rural schools, all say that no pot can call the kettle black.

In opening the conference President De Forest said of it:

"It is a propagandist body. It does not attempt to go anywhere and tell people with authority what they should do. Its function, if I may put it so, is maternal rather than paternal. It seeks to help, but it never seeks to command. . . .

"Have this thought in your minds as you leave this conference: Do not let us try to do everything. We cannot do everything. Do not let us try to remedy all these bad conditions. We cannot do it in a lifetime.

"There are certain practical things every one of us can do in every city in which we live. Pick out the particular things that can be done; center yourselves on those; do them, and, when they are done, turn to the next thing."

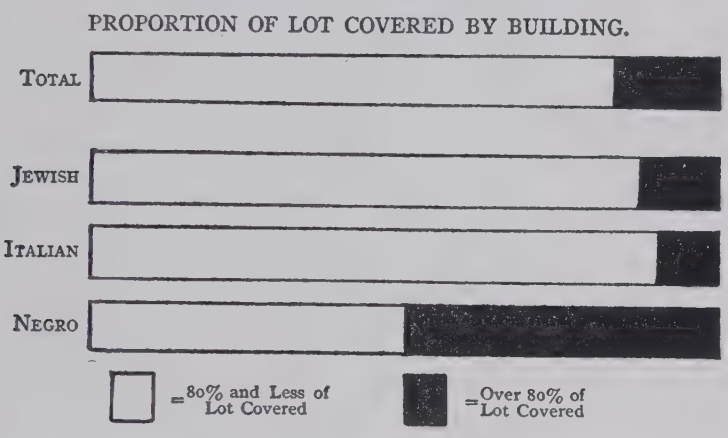
Every organization has the right to be measured by the yardstick of its choice. These words of President De Forest constitute the yardstick by which this conference has the right to be measured. Measured by this yard-

stick, the failure to adopt standard methods does not in any way argue that the meeting did not accomplish its aim.

About five years ago the Chicago department of health startled the community with a description of the relay bed system. Under this system the beds are occupied for about eight hours by one shift of sleepers who yield them to another set that hold possession for an equal length of time. Sometimes the beds are worked in two relays and occasionally in three.

I am sure that many people thought it mistaken when it said thrift was more largely responsible than was need. A considerable part of the lodger evil is the result of need but a larger part is due to greed.

In the conference discussion of room overcrowding there was related the



Henry Phipps Institute, 11th Annual Report.

FIG. 454.—A CERTAIN DISTRICT IN PHILADELPHIA.

old chestnut about a room in which four families lived, one in each corner, and one family took lodgers.

As to the degree of overcrowding, one speaker told of finding thirteen in one small room in rural Indiana. A story from Boston was of a man who took seventeen lodgers, and these so crowded the rooms that the proprietor's four daughters, 16 to 22 years of age, had to sleep in a closet.

In another place a man occupied three small rooms. In one small room he had six boarders while another housed his four grown daughters. Investigation showed that the five working members of the family had a combined income of $39 a week. It was thrift that was beneath this bit of overcrowding.

In the experience of the speakers on this topic thrift often results in so low a standard of living as seriously to imperil the health and well-being of the overcrowded families. As a general proposition, however, the speakers found that greed underlay overcrowding.

When a municipality tries to prevent room overcrowding violent opposition always arises. There is much talk about liberty, "invasion of the home," "a man's home is his castle," "the oppression of the poor," "paternalism"; gentlemen of experience record their judgment that when you scratch deep

enough you usually find that these battle cries come from men who raise them as a means of protection while they earn usurious interest rates by exploiting the poor.

Mr. Veillier came forward with a solution of the lodging evil, based upon the idea that greed is the most frequent underlying cause. He would hold the landlord responsible. In a dozen ways, under existing laws, he is held responsible for various conditions. He has abundant means of knowing the use to which his property is put, and he generally does know. A recent Chicago experience shows that it is the best way to tackle vice.

Mr. Veillier proposes the following ordinance:

"No tenement house, nor any part thereof, shall be used for the letting of lodgings without the consent in writing of the board of health, nor shall any person not a member of the family be taken to live within an apartment occupied by any family without such consent.

"It shall be the duty of the owner of such tenement house to see that the provisions of this section are at all times complied with, and a failure to so comply on the part of any tenant, after due and proper notice from him, shall be deemed sufficient cause for the summary eviction of such tenant and the cancellation of his lease."

Here was a definite how-to-go which was indorsed by some of the speakers but not concurred in by others.

The advantage of locating factories in the suburbs was advocated by John Nolen, landscape architect, of Cambridge, Massachusetts. By suburbs he means the peripheral part of a city and not suburban towns trying to maintain a separate government without proper revenues to meet the demands put on a village government in close proximity to a city.

In the discussion Mr. Fulton of the Keokuk (Iowa) Industrial Association said his society had employed Mr. Nolen to carry out his ideas on 400 acres of ground purchased at $250 to $400 an acre to be developed as an industrial city in connection with its newly developed electric power.

In the discussion Mr. Martin of Stapleton, N. Y., referred to "the city that is alive to the social value of the nickel fare." One of the walls around a city and perhaps the most impenetrable one is "the limit of the nickel fare and the one-hour ride."

In New York City the Public Service Commission has entered into a contract with the subway corporations under which the city puts up half the money and is then in the position of a stockholder guaranteeing the bonds of the bondholders—the subway owners.

This is a most improvident arrangement, holds Mr. Martin, except for the right given the city to command the building of the subway to any part of the municipal territory. This right, Mr. Martin thinks, will bring vast unoccupied areas into the 5-cent-fare, hour-ride zone.

Mr. Wright of New York City at once picked a flaw in Mr. Martin's point about the subway contract. Of course, the subway will build anywhere the city wants it to build if the city will pay the bill. This brings the question of where lines are to be built back where it began, namely, in a proper answer to the question, What will the traffic bear?

An interesting paper was that of Dr. Frankel on financing the small home. As a basis for a policy Dr. Frankel has studied the plans in use

in Europe, particularly Belgium and Germany, and he discussed these.

The discussion of this paper illustrated how far we are from knowing what is the best plan for financing the small house. The Albany House Building Company, the General Electric Company, the Roland Park Com-

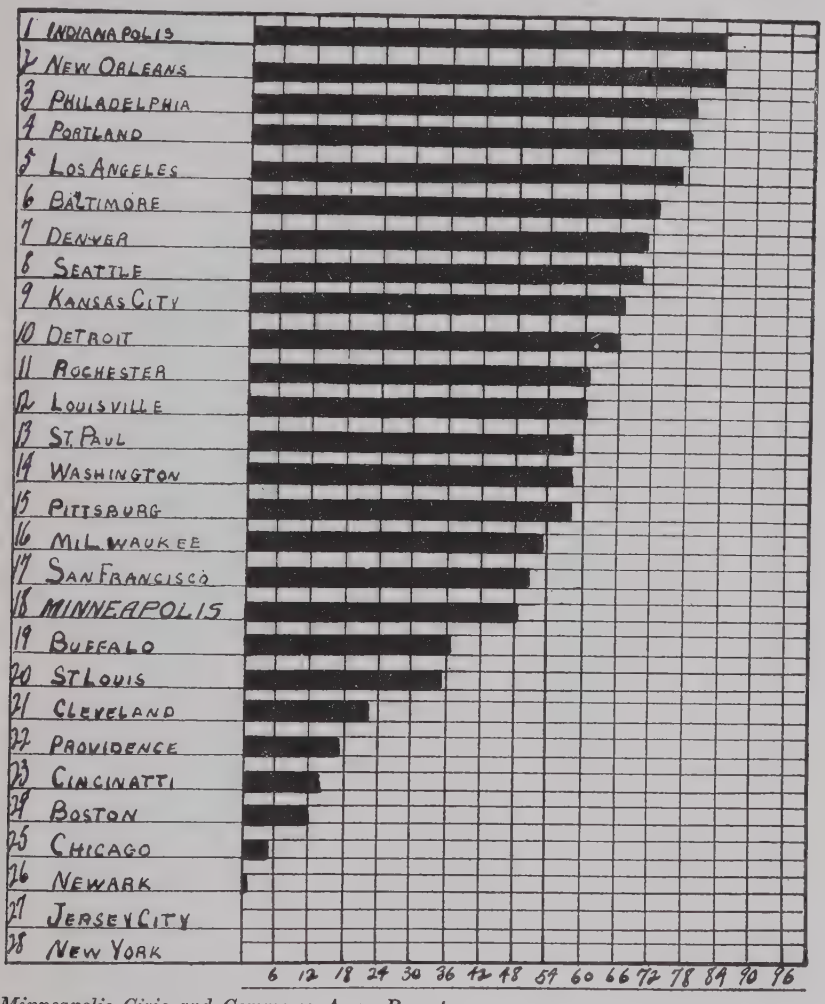


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FIG. 455.—CHART SHOWING COMPARATIVE STANDING OF LOCALITIES AS "CITIES OF HOMES."

pany, Mr. Pischel of the Cook County Real Estate Board and Dr. Bryce of the Dominion government each reported on methods that had been given a trial.

Other subjects ably discussed regarding "Housing Problems of America" were "Health Departments and Housing," "Regulation by Law," "Instructive Sanitary Inspection," "Wage Earners' Houses," "Garden Cities," "Rural and Suburban Housing," "City Planning," "What Are Tenements?" "To What Extent Are Tenants Responsible for Bad Housing," and "The Alley Problem."

HOUSE PLANNING

Housing is the most neglected problem of the present civilization. Towns allow houses built without proper regard for health. Then when those houses cause disease and the disease causes poverty the county agent or some charity takes up the burden—but no one thinks of going back to the cause.

The tendency all down the line is toward too much housing. Cows are housed in elaborate barns and they get tuberculosis. Indians are taken out of shacks and tents and placed in comfortable houses and they do not thrive. Children who are kept indoors get pale and catch everything that comes along. Adults of the races longer civilized adapt themselves more readily than children and the semi-civilized, but they do not thrive under it.

Much of the consumption, pneumonia and colds is due to bad housing.

AN IDEAL WORTH STRIVING FOR

"I picture in my mind a city in which the child, yet unborn, will feel in its being the stimulus of sunshine and fresh air; in which the babe will be born into a house fit to receive the gift of heaven; in which the child will never know the burden of the slum, but through normal development will come to manhood ready, joyfully, to do his share in the work of the world and qualified to assume a worthy citizenship."

—Chas. B. Ball, Chief Sanitary Inspector, Department of Health, Chicago

Fig. 456.—Ball's Motto.

Besides this there are the vague ill feelings, the lack of aggressiveness, vigor, and strength, the conditions short of definite illness. These are difficult to weigh. One man gives them undue weight; another thinks they are not important. Nevertheless, they have much to do with the joy of living.

Bedrooms should be used for no purpose but sleeping. In so far as it is possible work should be done outside the house. In the city garments are carried into the house. The children are driven out on the street. The rooms get crowded, littered, and dirty. In the country some of the farm work is carried into the house. Whereupon the bed and the clothes are pushed over into the corner. When the time for retiring has come around the temptation to go to bed in the unaired and disordered room is irresistible. The bedrooms will not get the airing and sunning which they need if work is carried into them.

If it is a question of building in the country the house should not be set facing squarely north or south or east or west. Never mind the road running the section line—set the house so that the sun gets the fairest chance at the

rooms. Nor should there be much shade. Shade on the streets and shade to a moderate degree in the yard is good, but the sun should have a fair chance to reach the house if the products of human contamination are to be made harmless. And what if the exposed house is hot in the summer

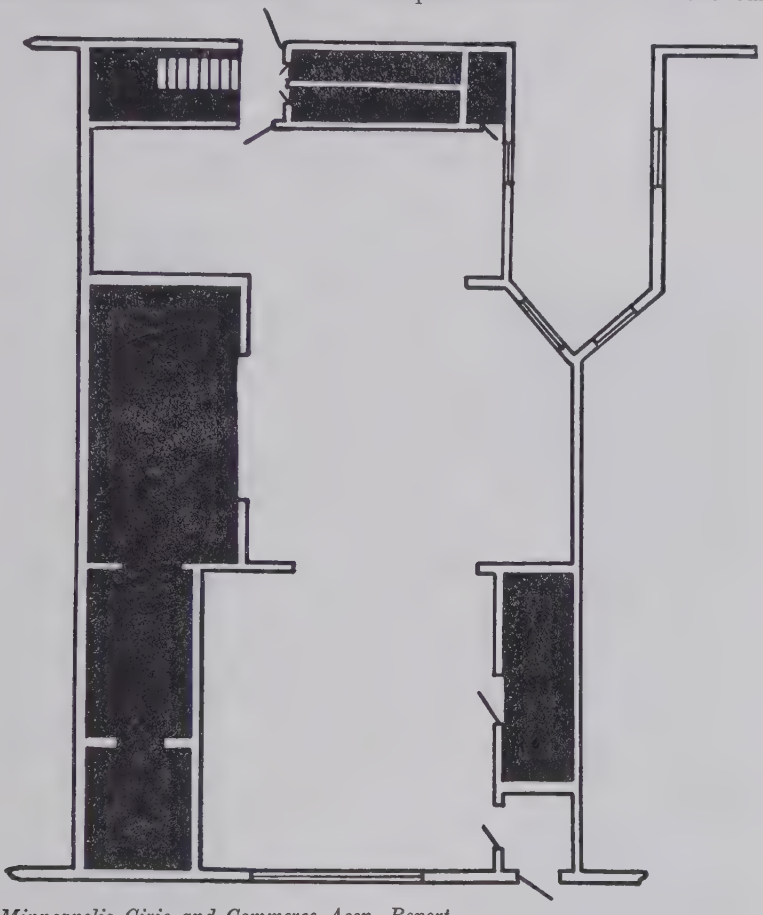

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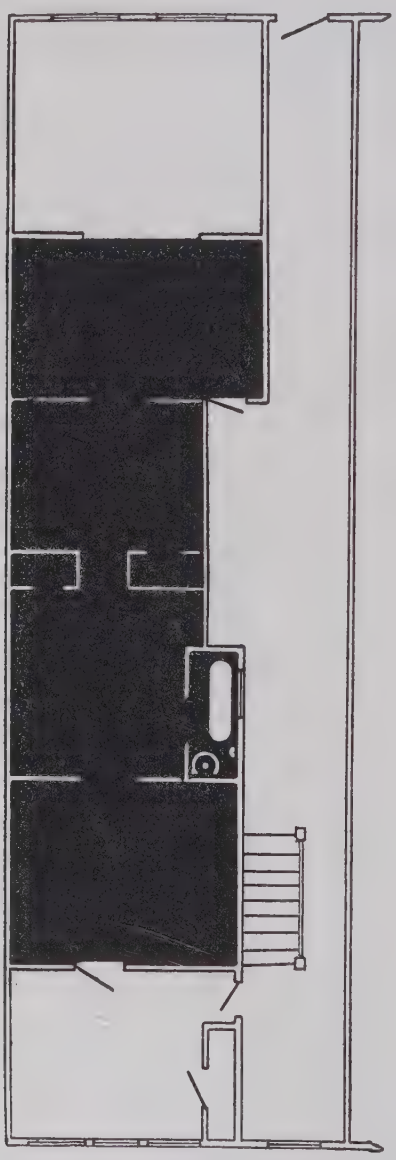
FIG. 457.—FLOOR PLAN OF ONE OF A SERIES OF BASEMENT APARTMENTS. The dark room on the right measuring 3 x 7 feet was used for sleeping purposes.

time? The family can move out under the trees, sit there, eat there and sleep there until the house becomes comfortable.

In building in a city there cannot be the same liberty. Land is too expensive. The house must set straight with the street. There should be enough land to allow sun and air to get at the house. City lots should never be laid out on a multiple of twenty-five feet. A twenty-five-foot lot is too small for a sanitary house of an approved and inviting type. Fifty feet costs more money than the average purchaser can afford. There is no element of city planning which means any more for wholesome lives and low taxes than provision for thirty-foot lots and a proper number of diagonal streets.

Recently a new building code was adopted in Chicago and the com-

mission fought for months over materials to be used, size of beams and matters of that kind. These matters are of consequence and should have had much thought. Important as they are, they are trifling as compared with the light and air and other sanitary provisions of the structures.



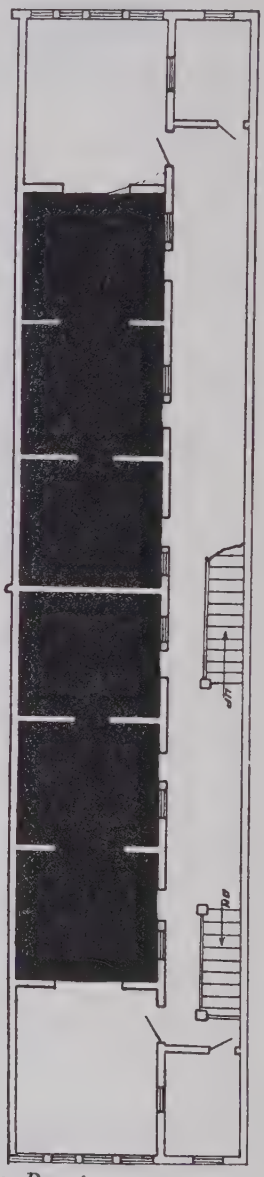


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FIG. 458.—SIX ROOMS, ONE BEHIND THE OTHER; OUTSIDE WINDOWS ONLY IN FRONT AND REAR. Note location of bathroom and toilet.

FIG. 459.—THREE OUT OF FIVE ROOMS DARK. Not even "through" ventilation possible.

The trouble with the commission was that it was badly balanced. It had brains, skill and technical training galore but the men were "dyed by that in which they worked." Their life work had been stress and beams and mortar and art. The few sanitarians were overbalanced. They brought out a code which was one of the best ever produced in this country from the standpoint of ventilation and light requirements, yet one in which health was written far too small. It went into the city council and certain aldermen fought to have it amended so as to make it less good.

Eastern cities once allowed bad housing conditions to develop to a degree that we know nothing of. In those old days of license six-story tenements grew up all over lower New York City. They had light courts eighteen to twenty-four inches wide. There were dark rooms by the tens of thousands. When anyone got consumption, pneumonia or a cold in one of these rooms he infected it; and the infection remained potential for a long time. So there came to be "lung" blocks.

New York organized its tenement house commission and passed a tenement house law. They ripped out old tenements and made wide sunlit courts. They now allow none of the old type to go in. This has cost millions of dollars. The diseases caused by the old-style tenements have cost additional millions. The yearly appropriation for the commission is more than $800,000.

The question of the housing of poor people is one of great perplexity. The houses should be pleasing to the eye as well as planned right. Houses that look slatternly and unseemly lessen the pride in neighborhood, street and home.

There is need for architectural ingenuity. The price of the rental cannot pass a certain percentage of the family income. If it does the family takes in roomers or boarders and that usually is worse than a cheaper house. We will say that a man can pay $12 a month for his house. He will not gain anything from occupying quarters for which he pays $16 a month if he rents out enough space to bring in $4 a month.

On the other hand the money invested must earn at least 7 per cent net after ordinary carrying charges are subtracted. Deterioration is rapid and hazards are high; so that the actual net will not be greater than 4 to 5 per cent. To build a house that is hygienic and sanitary and that will fulfill these economic considerations will require skill.

A housing commission should have builders of originality as a part of its membership. The price of real estate must not be high enough to make carrying charges prohibitive. Therefore, real estate men should be represented. But, finally, the most important point comes—the house must be lived in. Those who live in it must keep healthy and strong. If they do not the earning capacity is lessened, or sickness comes and the earning capacity ceases and the family unit is wiped out.

The New York Committee for the Investigation of the Condition of the Poor reports that sickness is the largest factor in producing poverty. We are sure that the United Charities in Chicago find that sickness causes more demand for help than any other factor; and bad housing causes sickness. And so, finally, a commission on housing should be composed largely of sanitarians and political economists.

HOUSING PLANS

A few years ago a presidential campaign orator said 41,000 of the 100,000 laboring families of Glasgow lived in one-room tenements. The inference was that American methods should be continued as, under them, no such conditions prevail. Whereupon Kober commented, "We need not go to Glasgow for such illustrations, for, to our shame, it must be confessed that similar conditions obtain in nearly every American city."

The New York Tenement House Commission found 370,000 dark

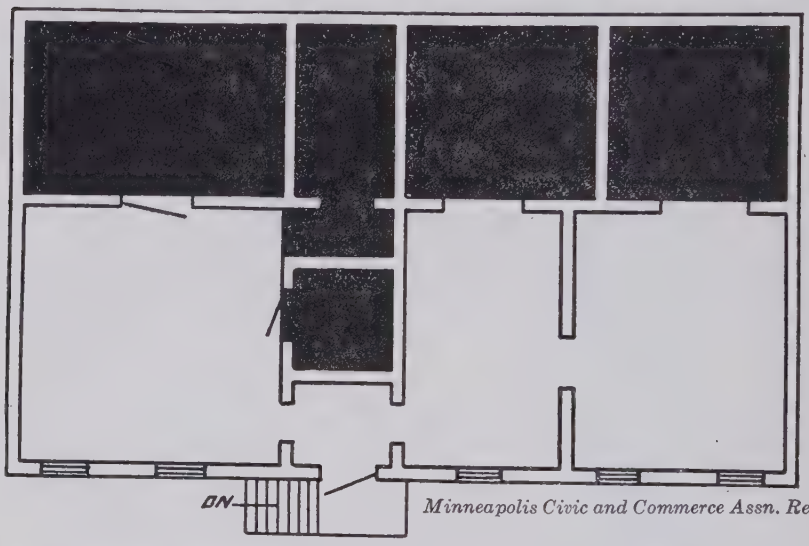

FIG. 460.—BASEMENT APARTMENTS. REAR ROOMS VIRTUALLY UNLIGHTED CELLAR ROOMS.

rooms occupied as living rooms in 1903. No full survey of Chicago has ever been made but two partial surveys indicate, first, that hundreds of thousands of Chicago laborers are physically handicapped, made inefficient and frequently made ill by living in dark rooms and, second, that things are getting worse rather than better.

The fact is that, while our workingmen earn more, our land values are higher, our building costs are higher, we have less town planning and less regulation of building so that, all in all, our housing is no better and in some particulars is worse than that of Europe.

In Europe and in America the plans for improved housing have taken many directions. In some cities homes and housing companies have built sanitary apartments so constructed that the rents are low and yet the capital invested earns 4 per cent. In other places these societies have built separate one-family houses and in still others houses two stories high and for two families. Plans for such houses so built as to render a proper return on the investment and yet with a rental of only $13 to $14 a month are printed in the *Survey* and in the *Journal of the American Medical Association* for 1911.

What makes the situation so difficult is that cities seldom get interested

in their housing until conditions are very bad. Then they try to cure rather than to prevent and curing anything, whether a sick body, a sick house, or a sick situation, is always more expensive than preventing it.

The crux of the situation is the price of land. English authorities say laboring men cannot live on ground worth over $1,500 an acre without being badly housed. Chicago's poor people live on ground worth more than $10,000 an acre.

Had Chicago planned ahead its people could have been properly housed without high rents. Not having done so, square miles of congested, insanitary, incapacitating housing must remain for many years. The property will not stand the burden of the taxation necessary for cure.

INFLUENCE OF HOUSING

As I sit here trying to stir up interest in housing among people who will be reading this book the question arises in my mind: Why is it that the people who live in poor houses are sickly? That they are is easy to prove. But why? It is difficult to put your finger on just the causes and prove your point. Time was when we charged it up to sewer gas.

I have recently reread the public hearings before the Chicago city council on an ordinance which made yard privies illegal and required that the plumbing of the houses should be properly done. The main provision of this ordinance was one requiring that water closets inside be substituted for privy vaults outside. The objectors painted horrible pictures of diphtheria and other sickness that would result.

Ten years ago sewer gas was held responsible for most of the diphtheria and scarlet fever. Then came the investigations made by experts employed by the plumbers and they proved that sewer gas did not breed contagion.

Bad house drainage does harm in a way to be developed presently, but it is not the most prominent reason for the sickness rate in bad housing.

We place a good deal of stress upon walls with wet feet. By this we mean walls so constructed that the ground water travels up the wall several feet from the ground.

The English building laws are strict on this point. They require that every wall that sets on or in the ground must have a layer of lead or some other material through which moisture cannot travel, to serve as a barrier to the wet foot. They allow wet foot but not wet ankle walls.

Cellar rooms or rooms which sunlight cannot get into are unhealthy if the walls are wet. I know of a few cases of blastomycosis where the germ found in the abscesses was also found in the paper of the wet basement walls. There is abundant proof that tuberculosis bacilli live longer and are more dangerous in a wet-walled room.

What stays on the walls hurts nobody. It is much better that the walls should catch the dirt than that the air should hold it. That is why sanitarians are against dusting. Wet walls give up their moisture and the germs that have grown therein to the air.

Yet there is no question but that dry room air does more harm than wet room air. If the walls could feed some moisture to the air the average room

air would be improved. We can say that wet walls contribute a part but not an exceedingly large part. The cold air leaks through the wall of a poor house and the heat radiates out. The poor man from his slender purse

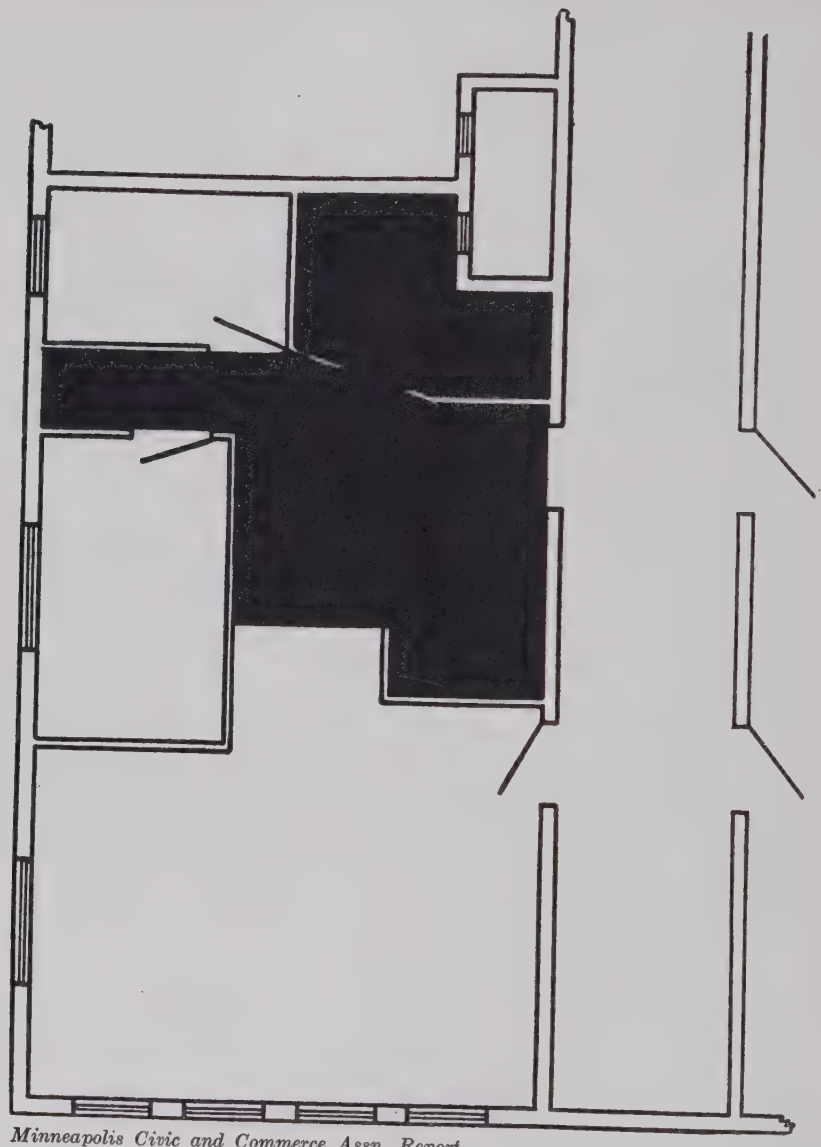

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FIG. 461.—SECTION OF FLOOR PLAN IN A NEW APARTMENT HOUSE (1912). Dining room has "borrowed" light only. Kitchen has opening to a vent shaft several feet under legal size with an odoriferous garbage chute in it.

must heat not only the air inside his house but a good deal of the outside air. The poorly built walls of his house make this a necessity.

Poorly built walls make for waste and discomfort. They do not cause

disease. The consumption causing, cold breeding, adenoid producing house is the comfortable, snug house. Surely thin walls are not the reason for the high sickness rate in poor housing.

So we might run down the list, trying to put our fingers on just the one thing that does the harm in bad housing, and we should fail.

I dare say some readers have already called to mind some sturdy, stocky, strong bull of a man who grew up in a hovel. They say: "There's nothing to it; this man proves that bad housing does not cause bad health."

In order to form any opinion worth while it is necessary to take a broad view. Forget the individual and study a group large enough to have the exceptions balance each other. Study one hundred people, or better still, one thousand, ten thousand, one hundred thousand. Just so to understand the harm of housing one must quit looking for the trees and look for the forest.

The first thing to do in fairness is to analyze the facts critically.

The death rate among people who live in poor houses is much higher than among people who live in good houses. The excess in the sickness rate is just as great but it is harder to prove it by figures.

The greatest excess is in the baby illness. Consumption, typhoid and contagion are also greatly in excess. From time to time health departments publish comparisons between the healthfulness of the different parts of town. In these comparative lists the districts where the well-to-do live show figures to be proud of. The districts where the poor live make us think that our boasted civilization is no better than savagery and our religion is but hollow form and ceremony.

The man who would be fair and just says that the blackness of that record cannot be charged to bad housing; it is the result of poverty and drinking.

He is in great measure right; but fortunately we are able to compare the same people in good houses and in bad. For instance, in the Liverpool report the comparison is between the same people with the same income in bad houses and in good houses built on the same ground. As would be expected, even after these poor people got into the good cheap houses they had a higher sickness than prevailed in the good districts. The baby death rate was reduced; but it still remained high. The consumption rate was cut in half; but it was still twice what other districts showed. The typhoid rate was much reduced. A fair way to divide it would be to say that the present rate was the normal poverty rate. The difference between the present rate and the former rate was to be divided between houses and whisky.

John Burns in dedicating one of the last of these new housing areas told of the decrease in the number of saloons. The night before he had walked through the district in which as a young dock laborer he had lived thirty years before and the decrease in drunkenness had been plainly apparent. The police returns of arrests for drunkenness told the same story.

The reports from other places where housing has been improved tell the same story.

After a few analyses that are fairly satisfactory we come to a point where the question does not analyze farther with gain. The fact is that influence of bad housing spreads out into many channels, operates in many ways; and all of these must be taken into consideration.

Not always but frequently, bad housing goes hand in hand with congestion. There are from several hundred to four thousand people living on the acre. Sometimes this great acreage density is due to the height of the buildings occupied. Sometimes it is because of the number who sleep in one room. Six, eight, ten or a dozen people using one small room as a bedroom is not at all infrequent in the congested portions of a large city.

What disease does overcrowding cause? The answer is: No one disease. Anything that gets in among such a group is apt to spread to others of the group. Consumption is the terror, of course. When it gets in there is not much hope for the person who gets it and just about as little hope that it will not get other members of the group.

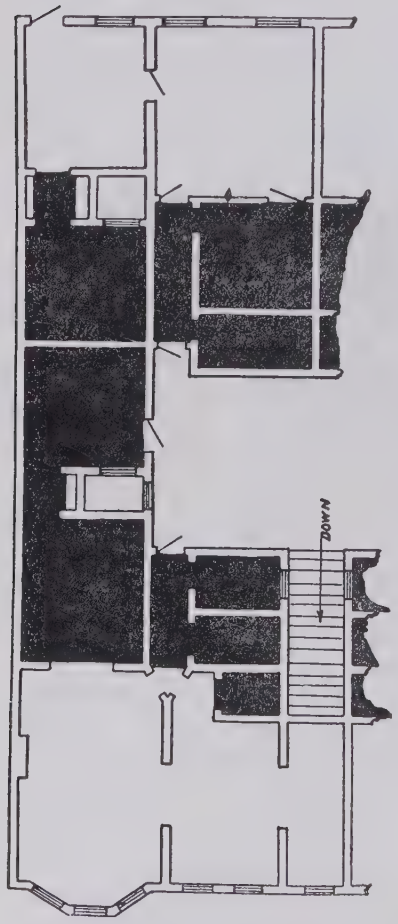

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FIG. 462.—DARK, UNVENTILATED ROOMS AND TOILETS IN BUILDINGS.

In poor houses it is generally necessary for several to sleep in the same bed. The dangers of this are obvious.

An overlooked danger is this: It is not possible to provide enough toilet facilities. There are too many groups. One toilet must answer for several.

If scarlet fever gets into one group it is pretty certain to spread to the other groups. It is not possible to quarantine all the people who use the same toilet as the sick person; and yet it does not do much good to plaster the front door with a sign telling people not to mix up when we know that they must use the same toilet room. Of course in this particular the yard privy and the yard hopper are the worst offenders.

In an area of bad housing the contagion rate is always high. When good housing replaces bad the greatest decrease is in the typhoid rate. Typhoid is spread by water, milk, flies and infected hands.

Good housing cuts out the common toilet room. It markedly decreases the finger-borne infection. It decreases the fly-borne infection somewhat less, yet materially. Those are the reasons for the fall in the typhoid rate when housing is made better.

The sharpest contrast between the rates of the rich and those of the poor is in the baby death rate. When the poor are moved from poor houses to better ones the baby death rate declines. The flies are lessened, the general dirtiness lessens, and the baby's milk is bettered.

When we introduce the subject of general dirtiness we open up a large

field and one that furnishes a large part of the explanation of the high death rate where the housing is poor.

As I see it, when we answer the question as to what are the standards of a neighborhood we get the answer to the questions as to the cause of the sickness rate.

The poor are apt to be fatalists. They are forced to say: "It cannot be helped" in regard to so many things that they would like to have changed.

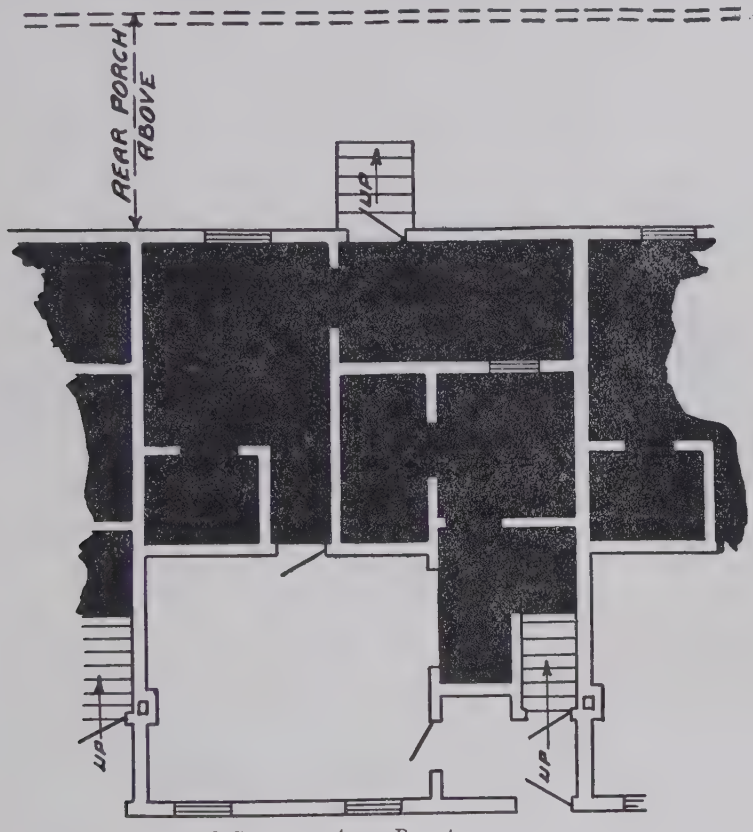

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FIG. 463.—DARK, UNVENTILATED BASEMENT ROOMS AND TOILETS FOUND IN SOME BUILDINGS.

When their children die they grieve but before long they come to think it cannot be helped. Scores of times mothers have said:

"Mrs. Blank ought to know what to do for a child. She has had ten."

"How many are dead?" I have asked.

"Eight, but it could not be helped," was the reply.

The first standard is that of the babies under a year. Not over one of ten should die.

The first essential is a proper death rate as a standard. There must be a proper contagious disease standard and a militant discontent when that standard is violated. There must be a proper standard of household cleanliness, of yard cleanliness, of alley cleanliness, of street cleanliness, of neigh-

borhood cleanliness. There must be a proper standard of personal cleanliness and of personal conduct.

When housing is bad all standards go to pot. That statement hits the bull's-eye. If the house is ramshackle and structurally disreputable, if sunlight and air cannot get in there is no use talking about crowding or cleanliness

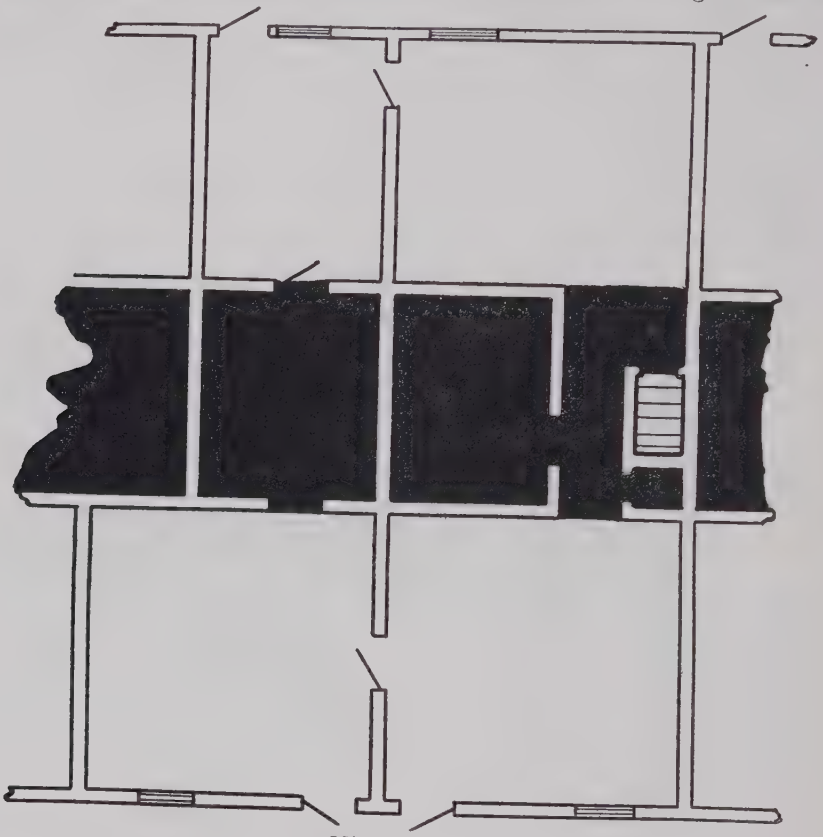

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FIG. 464.—TYPICAL FLOOR PLAN SHOWING DARK BASEMENT ROOMS. Children sleep in many of these dark rooms.

or anything else. There must be some family pride or household pride; otherwise you cannot have standards. Household pride and bad housing are as incompatible as oil and water.

Where the poor housing is replaced by good housing the flies decrease. The manure box is emptied; the garbage does not litter the ground. The alleys are paved and cleaned; the streets are cleaned.

Somehow or other (just how nobody can fully say) the sickness decreases, vitality increases, efficiency increases, headaches and minor ills decrease and the death rates drop. The health and life phases again merely represent the end product.

This section began by asking: Why is it that the people who live in poor houses are sickly?

The answer is that, while several factors are responsible, the most important is the influence of housing on the people who live in the houses. The structure of the house, the method of construction, the amount of air space, air and light are of importance, *per se,* but looming way above these is the fact that poor housing destroys the standards of those who live in the poor houses.

Poor people have the right to be protected against poor houses. They have enough dragging on them without this added load.

To keep standards when submerged in poverty is not an easy matter. It cannot be done when bad housing makes against it.

Most of the people in our cities have come in from the country. This is just as true of the immigrant as it is of the American born. They begin by trying to keep the house clean.

The poor soon find it impossible under city conditions. When they look out over a yard filled with cans to an alley filled with filth and out into a street where mud and garbage are mixed a foot deep they give up and let things drift. Whenever things drift the death rate goes up.

EFFECT OF GOOD HOUSING

When a family income is less than $10 a week the amount paid for rent cannot go above $2.50. If $2.50 a week does not pay for a house in which a man's family can be healthy (and that is all the man can pay) the burden of caring for the sick is put upon the people.

A rental of $2.50 a week does not mean much on the investment. What is the community going to do about it? It might force employers to pay enough wages so that 25 per cent of their earnings would healthily house their employees. That is slow and difficult. It might carry a part of the cost of housing.

In Liverpool the money spent for housing earns about 3 per cent. The bonds sold to buy this ground and build these houses and the sinking fund to retire them cost more than 3 per cent. The difference is paid out of taxes.

How does Liverpool justify this use of taxes? The cost of illness falls on the people. The cost of illness in the families earning less than $10 a week falls on the tax funds. The question arises: Does the money spent on housing decrease the cost of illness and immorality materially? If the answer is "yes" there is no doubt of the wisdom of the expenditure.

Kyffin-Taylor reported for the Housing Commission that in the rehoused areas the general death rate has been halved, the consumption death rate has been reduced to less than half, typhoid has been wholly banished, and infant mortality has been decreased 28 per cent. In the Adlington Street area the arrests for drunkenness decreased from 81 in 1894 to 2 in 1912; for assault from 40 in 1894 to none in 1912; for other offenses from 81 in 1894 to 2 in 1912.

The report says: "In the rehoused district there is a higher moral tone. Self-respect is more in evidence, and a keener love of home prevails."

The report contains a ringing contribution from John Burns, once a dock laborer in Liverpool, subsequently a cabinet member of the British empire. He says what he knew in Liverpool thirty years ago had so burned

itself into his mind, memory and determination that he took a solemn oath as minister to do what he could to wipe out such conditions.

He declares Liverpool's rehousing was a public health movement and not to be measured by pounds, shillings and pence. Housing was not only a good investment in itself but was the bread of reform cast upon the waters which returned to the people after many days in a manner of which they could hardly conceive.

"I walked out last night in the old districts where I had known the abysses of human misery," he states. "What impressed me on Baptist Street was that I did not see a drunken man. As I came out of Baptist Street through Ben Jonson Street and Dryden Street, changed from what it was of yore, I thought of Robert Burns' great saying:

"To make a happy fireside chime
For weans and wife.
That is the pathos and sublime
Of human life."

FINANCIAL PLAN FOR REHOUSING

After tearing down about 10,000 insanitary houses and in this way unhousing 40,000 people the city of Liverpool asked itself what had become of the unhoused people. It found them crowded into cellars and already crowded rooms. It found that new model houses and tenements were occupied by the best tenants of their kind in the city, the cream of the renters, while the skim remained in the privately owned houses.

In 1902 Liverpool began the policy of rehousing the unhoused in sanitary, cheap houses. Since that year it has torn out and replaced 5,358 houses. There remain 4,585 houses yet to be torn down and replaced. Of these 2,939 are exceedingly bad. The balance, 1,646, are insanitary in many respects but are less objectionable than the 2,939.

What has been the cost? The cost of the land and buildings, of removing the old structures and building the new ones has been about $10,000,000. The interest charge and sinking fund are about $240,000. The net rent is about $55,000. The money invested earns a little less than 3 per cent. This rate is averaged over about fifteen years.

Three per cent will not pay the rate of interest that the city of Liverpool must pay for its money nor will it carry the sinking fund; therefore, some part of the carrying charge is met by taxes.

The gross rent received in 1912 was about $130,000. The net rent was $53,000. The sum spent on repairs, renewals, general upkeep, taxes, rates and general care indicated that the authorities were taking good care of the property.

A statement sometimes made is that owners of property in the poor portion of town are entitled to high rents because of the instability of the population. It can be expected that a large part of the property will be vacant. In Liverpool empties decrease the revenues 8.78 per cent below the possible maximum.

Another statement is that bad debts are a high figure always. The loss from bad debts in 1912 was 2 per cent. Ninety-nine per cent of the rents were collected. During the year 1912, 630 tenants vacated city owned premises. Of these 205 left under notice from the corporation.

The corporation has erected two types of houses—one for the exceedingly poor, another for those not so poor. The loss from bad debts in the two groups is about the same—five-tenths of 1 per cent and 1.2 per cent.

The sinking fund retires the debt year by year. The amount outstanding at the time of the report was $4,500,000.

Thus we see that the Liverpool improvement, leaving out all public benefits, is not quite on a business basis. Taking into consideration public benefits it is on an excellent business basis.

REHOUSING IN LIVERPOOL

Liverpool's housing policy is this: Whenever the housing of a district is found to be well below the standard as the result of routine examinations by the sanitary inspectors an intensive study of the district is made. The facts as disclosed are set before the Housing Commission.

Let us say that in a given instance the commission decides that the district is a proper one for the application of its housing plan. It purchases all of the ground and all of the houses in the district. It then registers the names and addresses and income and rent paid by the people living in the houses. It keeps track of these people until it is ready to rehouse them.

The board then tears down the houses, rearranges the lots and builds new houses. It leaves open spaces for air; lays out playgrounds; builds stores, churches, playhouses and schools; erects houses, and sells off the surplus land, for, since the use of the land is carefully planned, it can give the homes more ground than before and still have land to sell. The commission then hunts up the former occupants of the space and gives them the refusal of the new houses.

Liverpool is the home of untrained workers. It is a great port, and a large part of the population are dock laborers, firemen on boats, and others who receive but small wages.

Most of the districts selected for rehousing are near the docks. The houses are built for men of small earning power. Men who earn 16 to 20 shillings a week ($4 to $5) are catered to. A dollar in England purchases about as much as two here. Therefore (let us say roughly) houses are built for men earning $8 to $10 a week.

The premises rent from 1 shilling sixpence a week to 6 shillings a week; say, 74 cents to $3 a week according to money's buying power in America. The average rent paid is around 75 cents a week. For instance, in the Grafton Street dwellings a man can get a three room flat with a separate kitchen and a separate bath and toilet room, all taxes paid, for $1 a week.

Of the 2,747 dwellings built by the Housing Commission 2,193 are reserved for persons dispossessed when the district was rebuilt. In Burlington Street 99.5 per cent of the people dispossessed moved into the new houses when completed. In Bevington Street, the proportion was 93.93.

The enterprise is run on business principles. Men who do not pay their

rent are thrown out. The bad debt losses are small. It is not a something-for-nothing scheme.

You ask what has this to do with health? That question will be answered later in this chapter.

PUNISHMENT FOR BAD HOUSING

A committee once analyzed the Chicago ordinances relating to buildings. Eighty-five per cent of them related to fire only; 12 per cent to contagion, sewage and garbage and 3 per cent to supply of air and light. If the group

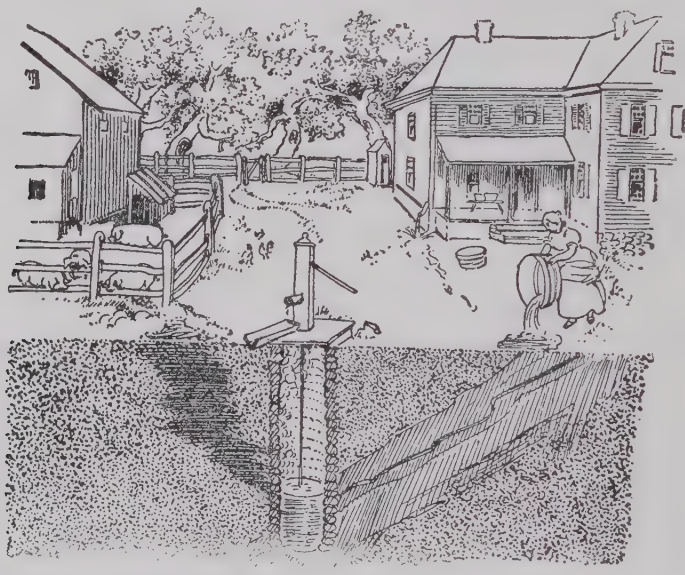


Fig. 465.—Water May Become Impure in Badly Located Wells from Surface Drainage.

—contagion, sewage, and garbage—is split evenly between the welfare of the inhabitants and the welfare of the property and the 6 per cent added to the 3 per cent of the third group we get a total of 9 per cent. More than nine times as much legislative attention has been put on fire protection than has been put on health protection.

Theoretically, government is divided into three branches—administrative, legislative and judicial—and each must keep its hands off the work of the others. It would not be fair to place all the blame on the legislative department and none on the other members of the triumvirate. Therefore, the exhibit shows why it costs so much to get bad housing corrected even when occasionally there is correction.

A chart shows a case of bad housing complained of on June 27, 1911. The first inspection was made by the health department on June 30. Bad conditions were found. Fourteen inspections were made.

The owner paid no attention to orders. After months of disregard of

notices the owner was sued. On October 23, 1912, the case was dismissed with costs. There had been six continuances.

The cost to the owner was $7.75; the cost to the taxpayers for inspections, health department attention and court expenses had been more than $250. The taxpayer paid the bill; the owner went free.

The usual method of improving the sanitation of housing is by fines—a remedy both inefficient and expensive. In speaking to the English parliament in favor of the national insurance bill David Lloyd-George, then Chancellor of the Exchequer, especially emphasized those features of the bill that raised the taxes on insanitary buildings. Since they increased the cost of government Mr. Lloyd-George proposed that the taxes be increased on them. He said:

"That will be a much more effective check [on the causes of excessive sickness] than the old, obsolete form of mandamus."

In this country (except in Pennsylvania) we employ the fining method — a method much more ineffective and much more expensive than the mandamus.

If the mandamus is a poor tool how inexcusable is our use of the much poorer tool, the fining system!

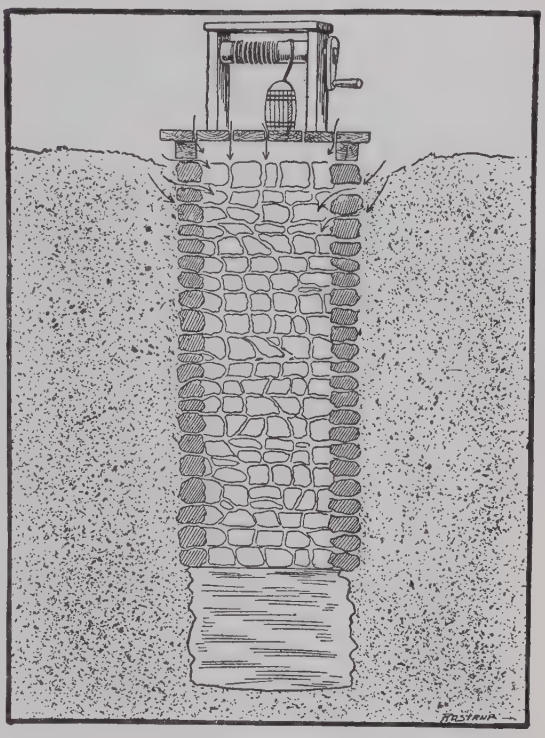


FIG. 466.—WRONG CONSTRUCTION OF A WELL. Usual method of pollution and even infection of wells.

In 1907 the Chicago health department began keeping the record for preventable diseases of every residence in the city. One chart contains the records of two small houses.

One of these in four years had seven cases of consumption charged against it. Another had a record of eight cases of consumption, two of scarlet fever and one of diphtheria.

In spite of all this, so good an authority as Professor Winslow pronounces the Chicago air and light ordinances of 1910 as basically the best in the country and I think he is right.

DISEASE HISTORY OF HOUSES

In 1907 the Chicago health department started a card index of contagion in Chicago according to the houses in which it occurred. This file

shows the contagious disease record of every house in the city. Nobody in Chicago needs to move into an unhealthy house. Anyone who wants to know the disease history of a house which he is thinking of buying or renting can get the information at the health department.

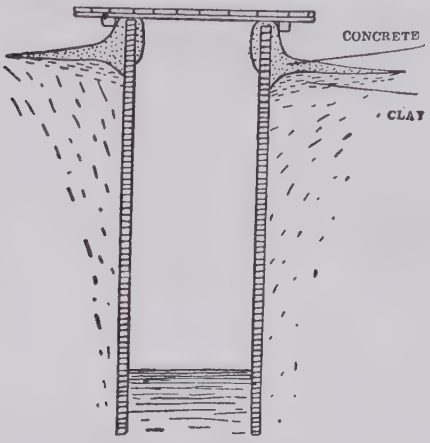


FIG. 467.—PROPER CONSTRUCTION OF A WELL.

This is a very important point in consumption. One of the sections of the model ordinance adopted by the Section on Preventive Medicine of the American Medical Association requires that all houses wherein people with consumption have lived should be disinfected, cleaned and aired before the next occupant is allowed to move in.

Every now and then a house gets a bad sanitary reputation. This is not always owing to the fact that it has been occupied by people who have lost their lives by certain contagious diseases. It may be laid to the fact of its bad construction. Its walls may be damp or they may be cold. Proper sanitary surroundings may have been disregarded in the selection of a site.

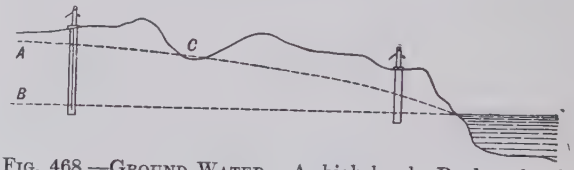


FIG. 468.—GROUND WATER. A, high level; B, low level; C, intermittent spring.

In the construction impervious materials were perhaps left out of the walls, especially of the cellar, so that they are not properly protected against dampness. Due consideration for scientific ventilation may have been overlooked and a poor system of heating installed. For these reasons the house lowers the vitality of the occupants until they are more liable to contract contagious diseases than if they lived in houses in the construction of which due regard for sanitation had been observed. The neighbors gossip about the amount of sickness in this house. Usually the reputation is not deserved.

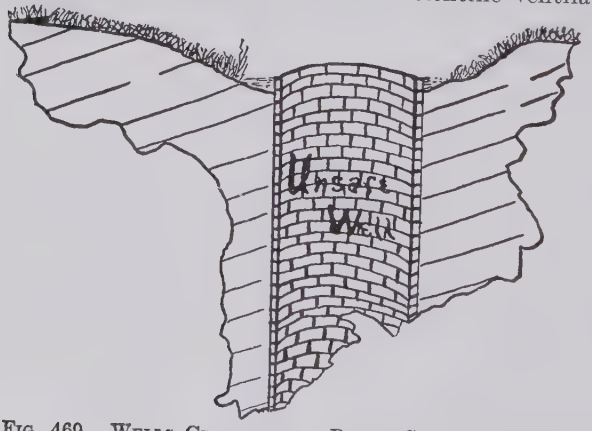


FIG. 469.—WELLS CURBED WITH BRICK, STONE, CROCK OR WOOD ARE IMPROPERLY PROTECTED and SELDOM SAFE IF THERE IS ANY SOURCE OF DANGEROUS CONTAMINATION IN THE VICINITY.

If a careless consumptive has infected a house it may stay infected for a few months but in less than a year all of the consumption germs in dark corners will be killed off. On the other hand, an insanitary house may lower the resistance of the occupants until they are more liable to catch consumption than if they lived in healthier houses. In so far as certain houses deserve a reputation for being a causative factor in producing disease, it may be said

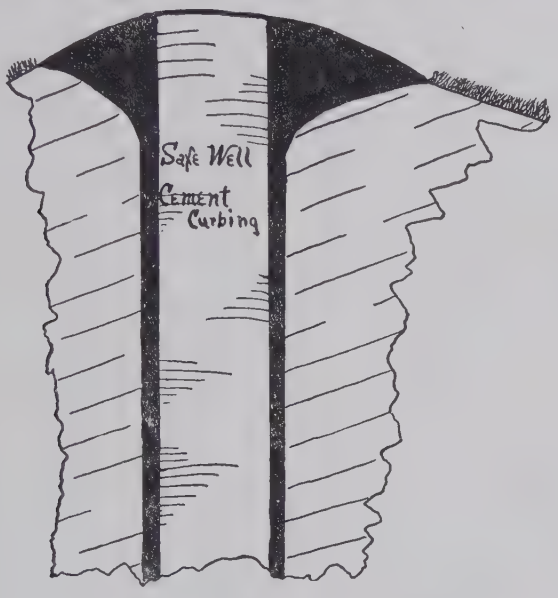


FIG. 470.—SAFE WELL. CEMENT CURBING.

that it depends upon how much they are responsible for putting people in a condition to catch the disease.

CONGESTION OF POPULATION

There are parts of New York City where 4,000 people live on a single acre. A few years ago New York held an exhibit in which one could learn something of the density of population and of the harm which it was doing.

Congestion of population grew in New York because nobody had planned ahead. Planning to cure is always more expensive than planning to prevent; but planning to cure is less expensive than allowing present conditions to continue.

They appointed a Commission on Congestion of Population. This commission is composed of ten aldermen, two representatives of the administrative arm of the city government and nine others.

Their recommendations come under fourteen heads, as follows:

1. Restriction of the height or volume of buildings other than tenements.
2. Restrictions upon the lot occupancy of buildings other than tenements.
3. Restriction upon the height of tenements.
4. Methods of encouraging three family tenements.

5. Measures to prevent room and apartment overcrowding.
6. Measures to secure better conditions of labor.
7. Measures to secure a better distribution of factories.
8. Parks, playgrounds, schools, and recreation centers.
9. Measures to keep land cheap and to provide good and cheap housing.
10. Measures to promote health and safety.
11. Distribution of population through municipal control over charities.
12. Immigration.
13. Delinquency.
14. Public squares and buildings.

Chicago is headed toward the corner which New York finds itself in.

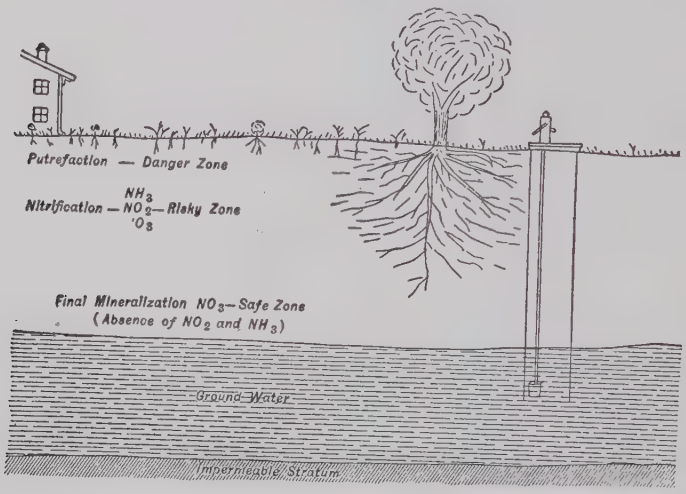

Putrefaction — Danger Zone
Nitrification — NH_3 NO_2 O_3 — Risky Zone
Final Mineralization NO_3 — Safe Zone
(Absence of NO_2 and NH_3)
Ground Water
Impermeable Stratum

FIG. 471.—DIAGRAM SHOWING HOW A WELL (with waterproof wall) MAY EXTEND THROUGH DANGER ZONES AND RISKY ZONES TO REACH WATER IN SAFE ZONE.

The Association of Commerce, the Chicago Plan Commission, the real estate board, the School of Civics and Philanthropy, the Chicago Homes Commission and the health department are each doing a little to stem this tide. But the little is overshadowed by the need.

Professor Tufts found some bad housing in every town in Illinois which he studied. There is some bad housing in the best of our towns and villages. It is a matter which, uncontrolled, automatically gets worse. No village can be "smuck" on the question of congestion. While one citizen may have a hundred acres somewhere in the village other people are sleeping more than three in a room, and a room with bad sanitation at that.

Why not read the report of the New York Commission on Congestion of Population? Address City Hall, New York, for a copy.

PRICE OF LAND

Upon no other item rests so much responsibility for congestion of occupation as the high price of land. In the case of central real estate the build-

ings placed on it must go hundreds of feet into the air and two and sometimes three stories underground in order to earn the carrying charges.

But of more importance is the effect of the high price of land on residential congestion. There are forties in Chicago averaging more than 400 people to the acre and single acres housing more than 1,000. In New York there are acres which house more than 4,000. Whenever land goes over $10,000 an acre you have to jam people together like flies to keep the rent within their means.

Whenever a building lot for a laboring man's cottage costs more than $200, or $8 a front foot, things are tending in the wrong direction. Whenever it passes $800, or $32 a front foot, the space for sunlight, air and vegetables is going to be cut down, the house is going to be less well built, the tendency to build two or three houses on the lot is going to increase, the number of boarders is going to increase—to sum it all up, the death rate will rise some, the preventable disease rate will rise, more women and children will have to go to work in factories or in service—and the men will work at lower efficiency. Seventy-five to $100 a front foot makes a situation for which there is no cure.

As Nettleford says: "Poor people live on dear land, rich people live on cheap land, which is absurd."

The death rates run up pretty nearly parallel with congestion of occupation. In Glasgow, where the people average 1.3 persons to the room, the death rate is 21.7; where the average is 2, it is 28.6. In Budapest, where the average to the room is 2, the death rate is 20; where it is 10, the rate is 79.

Jewett, in *Town and City,* says: "In Berlin, among the 73,000 people who live one family to one room, the death rate is 163 per 1,000. Among the 398,000 people who live one family to four rooms or over, the rate is 5.4."

Not all this difference was due to differences in congestion, but if even a tenth of it came from crowding it still would be a powerful argument against congestion.

TO PREVENT LAND SWEATING

To keep the price of land within bounds, to prevent what the English term "land sweating," several plans have been proposed.

Mr. Foulke, while president of the National Municipal League, reported to his association on the plan used since 1904 by Frankfort-on-the-Main. That plan provides that every change in land ownership not depending on inheritance (that being otherwise provided for) is subject to a city tax of 2 per cent and if since the last preceding transfer there has been an increase in value of more than 30 per cent of the former price there is an increment tax as follows: Five per cent for an increase up to 35 per cent, 6 per cent for an increase up to 40 per cent, 7 per cent for an increase up to 45 per cent and so on—1 per cent being added for each 5 per cent of increase.

The limit of the total tax is 25 per cent. This is in addition to the general increment tax law of the empire, the maximum limit of which is 30 per cent. At the end of five years the relation of the general and local increment taxes is to be adjusted.

A second feature of their plan is to have the city go into the real estate business, in part through that power of excess condemnations (generally held to be illegal in this country). The city owns 2,860 acres besides the city forest—about 21 per cent of the total acreage. "The purpose of securing this acreage was to prevent undue and unsound speculation by private persons and the holding back of property for excessive prices, intermediate agencies enhancing the price of land."

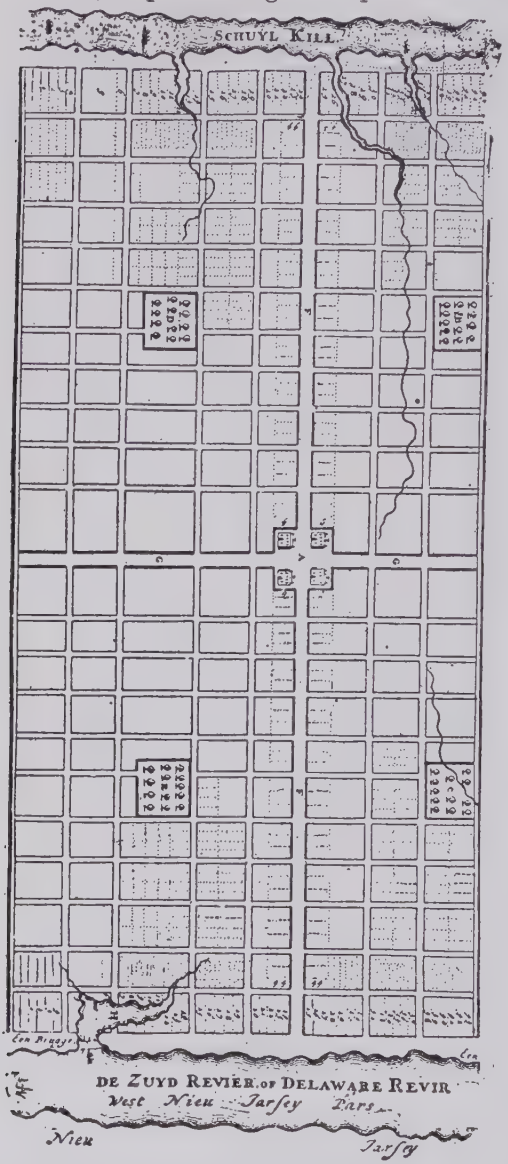


FIG. 472.—WILLIAM PENN'S PLAN OF THE CITY OF PHILADELPHIA. The system that might serve the small city is ill adapted for extension to the large, though even on this little plan the waste and ineffectiveness of straight streets and rectangular blocks, with no diagonals, is obvious. ("Charities and the Community.")

According to Foulke this policy was inaugurated in 1898 in the German settlement of Kiao Chau in China, "where the government evidently intended to receive part of the increased values resulting from the growth of a new community."

Two cities in Saxony adopted the plan in 1902. Helbersdorf inaugurated it, terming the tax an increment tax, in 1902. In 1911, 652 other German communities had adopted it including Cologne, Essen, Dortmund and Berlin.

There are many other admirable features of the Frankfort plan.

In this country there are ten Frankforts, each probably named for Frankfort-on-the-Main. How many of them are planning as thoughtfully, as learnedly, as wisely as old Frankfort? What say Frankfort, Ky.; Frankfort, Mich.; Frankfort, Ind.; Frankfort, Ill.; Frankfort, O.; Frankfort, Okla.; Frankfort, S. D.; Frankfort, Kas.?

Will our Liverpools try to emulate Liverpool, England, our Berlins the German capital?

MORE ABOUT TOWN PLANNING

One of the best laws passed on this subject is the British town planning act of 1909. Part 3 of this act relates to the provisions for and organization of health departments—a recognition of the principle that town planning and housing provisions are essentially health matters.

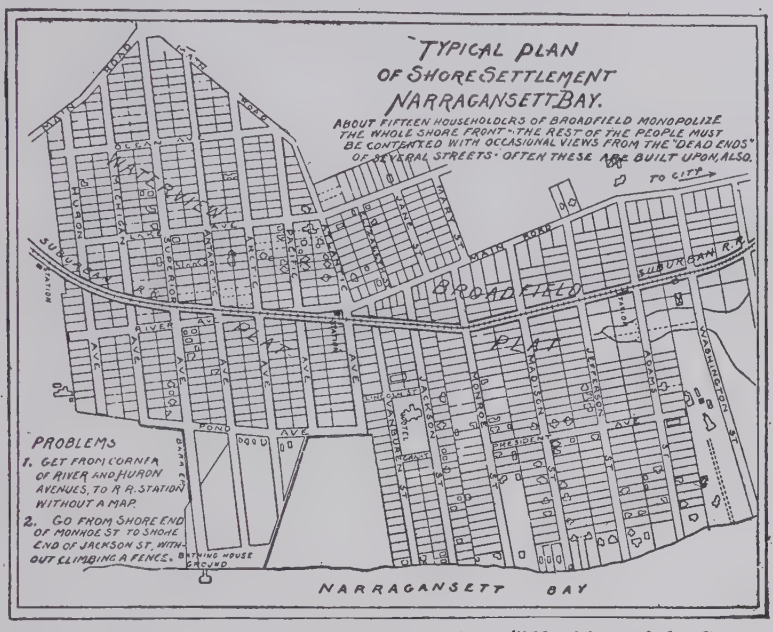

TYPICAL PLAN
OF SHORE SETTLEMENT
NARRAGANSETT BAY.
ABOUT FIFTEEN HOUSEHOLDERS OF BROADFIELD MONOPOLIZE THE WHOLE SHORE FRONT. THE REST OF THE PEOPLE MUST BE CONTENTED WITH OCCASIONAL VIEWS FROM THE "DEAD ENDS" OF SEVERAL STREETS. OFTEN THESE ARE BUILT UPON, ALSO.
TO CITY
BROADFIELD
PLAN
PROBLEMS
1. GET FROM CORNER OF RIVER AND HURON AVENUES, TO R. R. STATION WITHOUT A MAP.
2. GO FROM SHORE END OF MONROE ST. TO SHORE END OF JACKSON ST. WITHOUT CLIMBING A FENCE.
BATHING HOUSE GROUND
NARRAGANSETT BAY

FIG. 473.—THE USUAL WAY—THE WATER FRONT SHUT OFF. ("Charities and the Community.")

The Canadian Public Health Association has a housing section and the American Public Health Association has recently organized a sociological section in which housing is to be discussed.

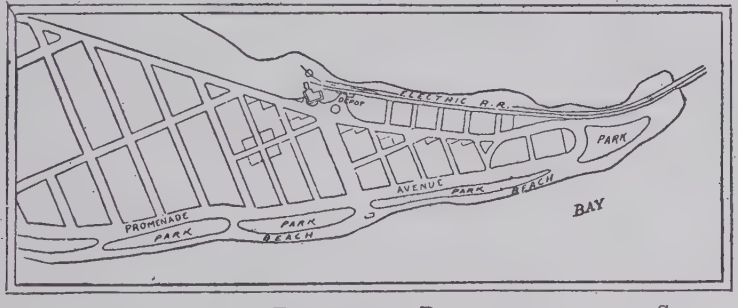


FIG. 474.—AN ADMIRABLE EXCEPTION—A PROMENADE ALONG THE SHORE. ("Charities and the Community.")

Nettleford quotes Professor Muirhead as follows:

"The problem of the last generation was to provide gas and water; the problem of the next is to provide light and air."

That health authorities are not well posted in housing and have shown no special interest in the subject is no reason for separating the work from them. I think it fair to infer that health officers will be ready to handle housing by the time the people are ready to have it handled. Town planning and housing are health problems. Let us do all that we can to encourage and nothing to discourage this idea.

Berlin and Paris were made beautiful by tearing out slums and building boulevards and parks on the vacated grounds. That these improvements did not increase the taxes was because the government condemned large tracts of ground, razed the buildings, improved the property on them and then sold a part of the ground at a price justified by the improvements. The people, rather than land speculators, got the benefit of the increase in price from betterments and public use.

The legal right to proceed in this way is called the law of excess condemnation. In this country some communities have tried to proceed in this way but the state supreme courts have found the state laws provided for it to be unconstitutional.

Crawford, at the 1911 Conference on City Planning, said: "A decision by a state court upholding excess condemnation within reasonable limits would in turn be upheld by the Supreme Court of the United States."

Without this principle of excess condemnation American cities must either be planned from the very beginning or else city planning on any effective scale must be abandoned, for the cost is prohibitive. How can we make a Supreme Court see this?

One of the provisions of city plans which is both logical and difficult to bring about is division of the city into zones with a series of regulations adapted to each.

The following resolution was introduced in the city council at Rochester, N. Y., in 1900:

"It is inequitable, as often happens, to sections of our city which have achieved a trade mark of special value by reason of residential unity and beauty, to have some vandal destroy such special value upon the plea that 'he has a right to do as he likes with his own property.'"

A part of a proper zone plan is variation in the width of streets and in their method of paving. To provide that no street shall be less than 100 feet wide and that no house shall be wider than the street on which it is located is wise for central areas. Had it been inaugurated when Chicago was begun downtown property values would never have attained their present dangerously high levels and the city at large would have prospered more. In the outlying districts ordinances requiring wide streets and expensive paving work great hardships.

Alderman Thompson of the National Housing Reform Council of England says that under modern conditions of subdivision the cost of roads and sewers reaches from $45 to $225 a cottage and puts up the cost of rents. A forty foot paved road on the outskirts of a town costs $1,000 to $2,500 an acre.

Nettlefold says that where there are fifteen houses to the acre the rent must be advanced one-sixth to pay for the cost of street paving and repair on a forty foot street.

Unwin has worked out a plan of adapting the width and improvement of the street to its use so that an owner with twenty acres can put in the improvements and build 340 houses for the same money as 200 houses would cost if rectangular streets of uniform width and paving were paid for.

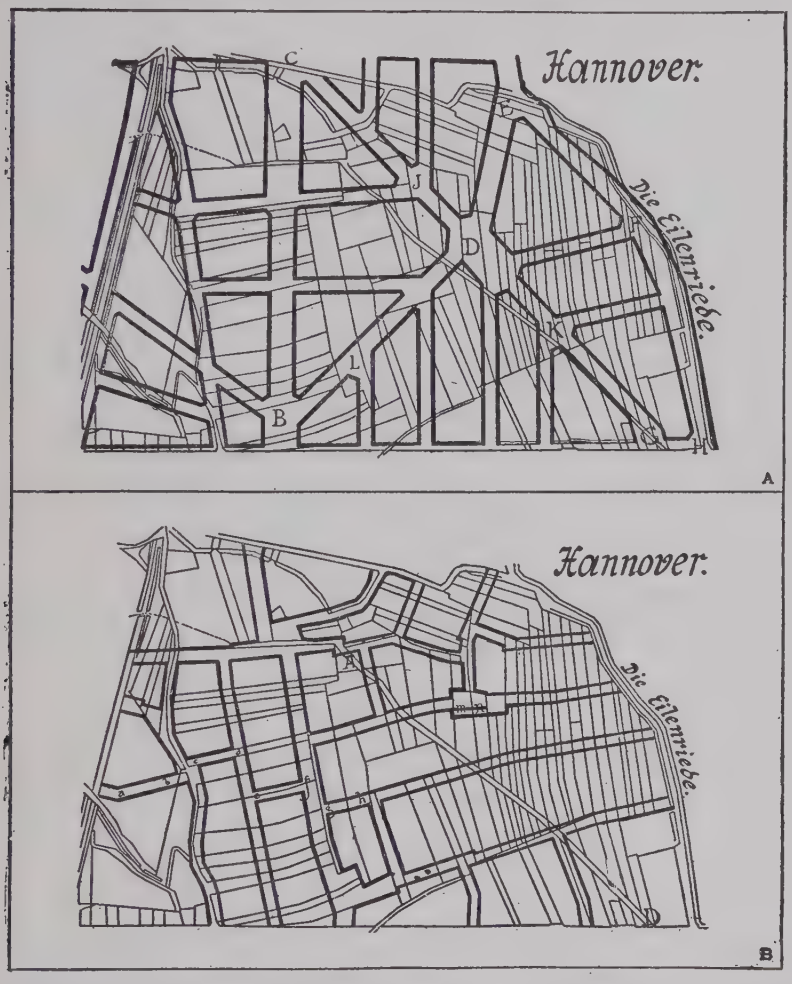


Fig. 475.—Showing Difference Between Haphazard (B) and Scientific (A) Street Planning of Irregular Plot. ("Charities and the Community.")

In the London Town Planning Convention of 1910 Hogemen of Berlin and Adams of England both said that wide streets caused tenements. "It was necessary that the owner extract from each yard of his frontage enough rent to pay its share of the costly street."

For outlying districts narrow, winding or diagonal streets make it possible to spend more on the sanitation of the homes. Where traffic of the future promises to be dense and a wide street may at some time be wise in the intervening years a narrow paved area bordered by grass and trees is good economy, good sense and good health.

As between rectangular streets exclusively and a combination in which some of the streets are diagonal and some rectangular Robinson says esthetics, sanitation and convenience all favor the latter.

In Vienna the crowds are handled with less inconvenience than in any other city and there the cars come in on diagonal streets to the Rigstrasse, which they follow around to deliver their passengers as near as possible to their destinations.

Robinson says: "The two diagonal streets, Broadway and the Bowery, in New York, saved for the city breathing spots like Madison and Union squares—space out of reach if condemnation had been required."

Of much more importance than plans for the streets, however, are those for the structures on them. In fact, often expenditure for streets indirectly raises death rates.

I have in mind several cities near Chicago that have spent all of their money, bonded themselves to the utmost and are now practically bankrupt, having exhausted their resources for expensive paving. Their death rates are high; yet they can do nothing for their people because of their orgies of street building. They have no health department, no hospitals, no laboratories, no school inspection, no building inspection, no anything which runs straight to the welfare of the people, because of their street improvements.

FLAT AND COTTAGE

E. R. Pritchard has lectured for years against flats. His lecture is illustrated by epigram, anecdote and poetry. His auditors go away interested and impressed but the percentage of people living in flats mounts year by year.

There is much to be said against trying to raise a family in a flat and Mr. Pritchard says it well. Many others have said it. Yet the trend is flatwards and no amount of preaching stops it.

In 1912, in Chicago, 42.1 per cent of the building permits were for flats and but 28.8 per cent for residences other than flats. Only 18 per cent of Chicago families, according to the survey displayed at the City Club, live in single family residences.

An analysis of 12,628 Chicago building permits shows that less than 1 per cent of the apartments are to house a household in two rooms. The three-room apartments make up 3 per cent of the whole; the four-room apartments, 33 per cent; five-room, 30 per cent; six rooms and over, 33 per cent.

Not at all a bad showing. A five-room flat with all of its space and labor saving provisions will serve a family as well as did an old-style eight-room house.

When we study the heights of buildings we find nothing to complain of. Of the permits issued in 1910, 37 per cent were for buildings one story high, 46.2 two stories high, 3.7 three stories high, 1.7 four stories high, and over four stories, 1.1.

Comparing the type of building with that in vogue in 1870 we find the greatest change is in the reduction of the percentage of one story buildings

from 73 to 37 per cent, and the increase of two-story buildings from 20 to 46 per cent.

No type of building is more unsatisfactory, more uncomfortable and more expensive to maintain than is the one-story cottage. In fact, much of the trouble in housing at present is the result of one-story house building in 1870.

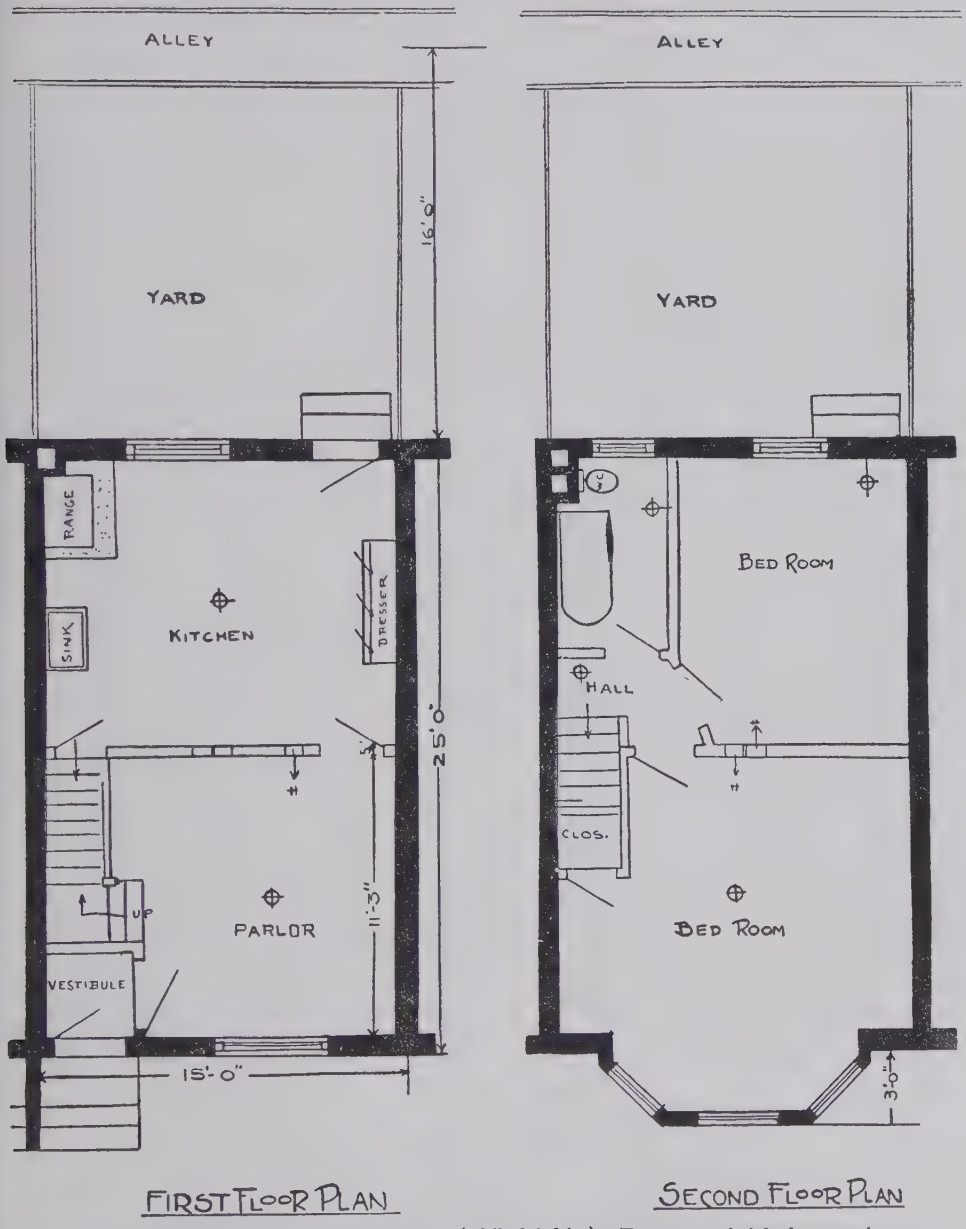


FIG. 476.—A HOUSE FOR EACH FAMILY. (Philadelphia.) Two-story brick houses, 4 rooms and bath. Selling price, $1,750. Rent $13 a month. (National Housing Association Publication No. 7.)

A study of the location of living apartments with reference to the street is disquieting at first blush. In a study of about 2,500 insanitary living places over 1,400 were found fronting on alleys, yards and courts rather than on

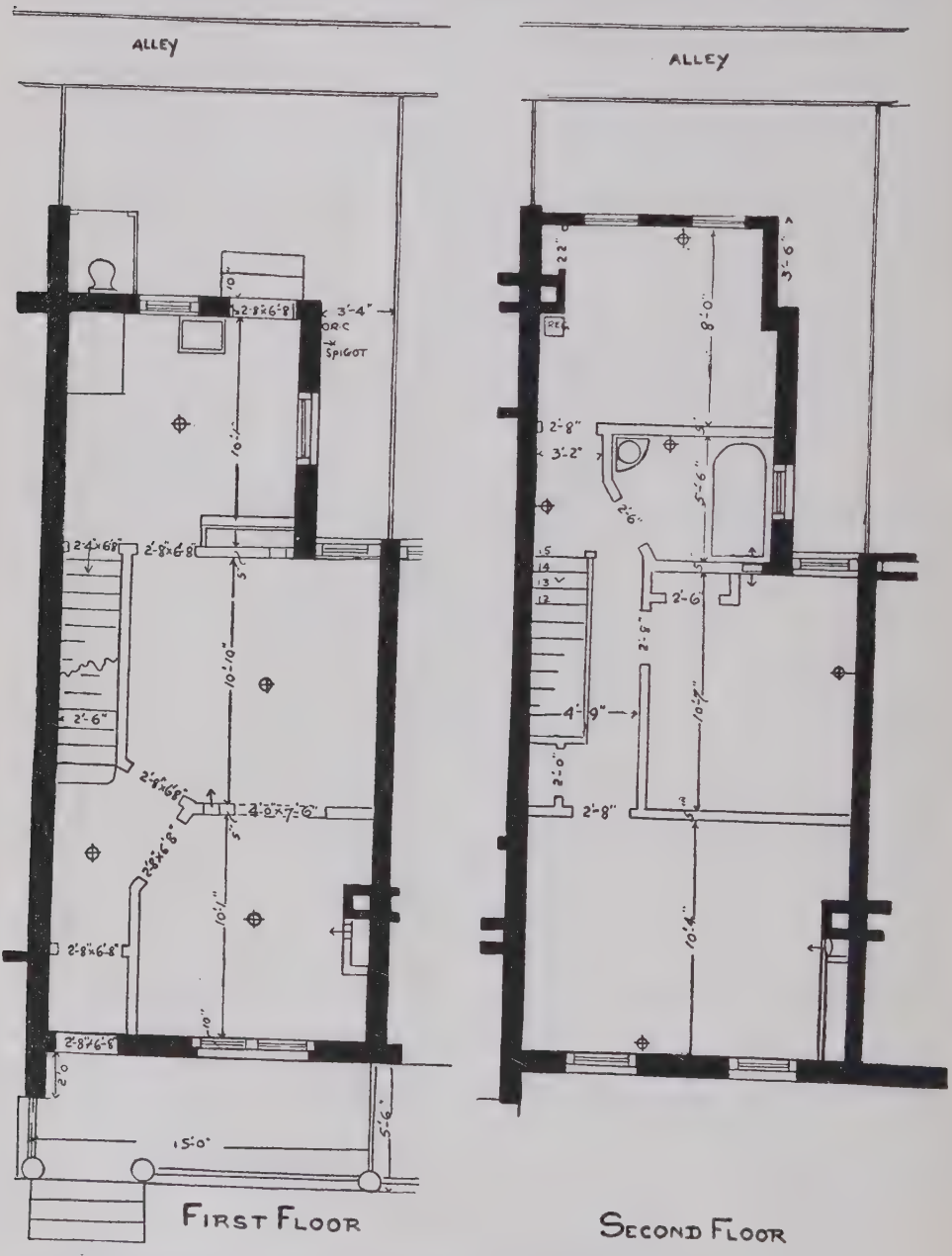


FIG. 477.—MECHANICS' HOMES. (Philadelphia) Six rooms and bath. Rent $16 a month. Brick houses, built in rows. Sale price, $2,000. (National Housing Association Publication No. 7.)

the street. Yet in old style premises the servants' quarters were reached through the alley.

Two hundred and seventy-six premises were in the rear of stores and

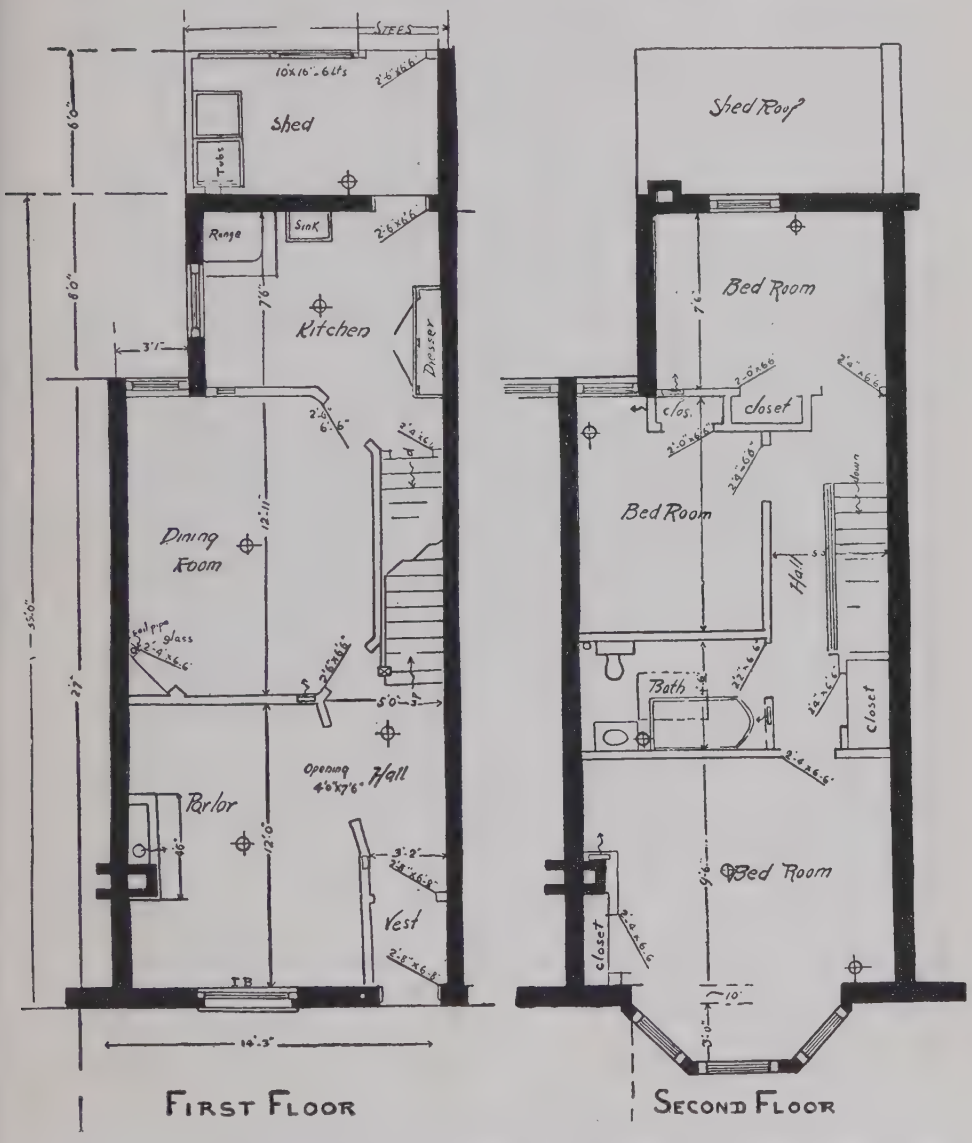


FIG. 478.—ANOTHER TYPE OF MECHANICS' HOMES. (Philadelphia.) Six rooms and bath. Cost about $1,400. (National Housing Association Publication No. 7.)

yet everybody is agreed that the tendency of modern times is to get industry and trade away from the home.

Things are getting better; but our standards are climbing faster than the conditions surrounding us.

Bad Housing Conditions.—*Miss. J. I. F. thinks Chicago housing conditions should be receiving more attention than they are at present. She says that looking north from West Chicago Avenue, near the terminus of the street-car line fifty newly erected cottages can be seen. They are set along the front line of the lot. They are but two or three stories high but they have not been so erected as to get as much light and air as they should have. One remedy suggested by her is that the houses alternate with respect to their positions on the lot, that one house be set in front of the lot and the next on the back.*

Reply.—There is no question that neglected housing constitutes one of the great wastes of the day. We are drifting into congestion and bad housing situations which are going to prove almost impossibly expensive when we come to remedy them. They are costing vast sums now in the way of inefficient labor and consumption and other diseases; but we are drifting along toward worse conditions. Nor is it limited to large cities. Lake Forest has bad housing; Springfield has much of it. The farmer suffers from it.

The Chicago ordinances passed January, 1911, cannot be enforced because there is no appropriation. The poor people are without protection.

The checker board plan would give more light and air under certain circumstances and yet a twenty-five foot lawn, plugged on three sides, would not help much. Generally speaking, authorities believe it vital to keep the rear of the lot unoccupied.

I think the present Chicago ordinances a better solution than yours. The problem is to get money for the health department so that the present ordinances may be enforced.

CHAPTER LX

The Home

SITES FOR BUILDINGS

Soils have been frequently and justly, too, charged with having much to do with the prevalence of certain diseases not only among men but cattle as well. A knowledge of soils, then, is highly important, since their constitution with reference to moisture and dryness, chemical and physical makeup,

FIG. 479.—TWO SPRINGS. ONE PROTECTED FROM SURFACE CONTAMINATION; THE OTHER NOT.

permeability and impermeability and their configuration will have much to do with the selection of building sites.

Building sites should receive the most careful attention. First of all, the site should be dry and free from the accumulation of organic matter. Granite, limestone, clay, sandstone, slate, chalk, gravel and sand (when the subsoil water is not too high and is free of organic impurities) make excellent sites for building purposes.

In determining the building site high ground is naturally preferable. In the country districts you usually find the house built on the top of a hill, on the hillside or on a knoll. They are usually built when possible in close proximity to a supply of pure water for domestic purposes.

Alluvial soils, marsh lands and gravel and sand with clay subsoil are regarded as unhealthy selections for building sites. Buildings should not be located near marshes, stagnant ponds, swamps, badly kept mill dams and polluted creeks. Sites on the banks of rivers which are subject to periodical flooding or which have a sluggish flow are usually unhealthful.

In the selection of building sites made lands and sites formerly occupied are to be regarded with suspicion, if not rejected. Such sites are either contaminated with garbage, rubbish and decaying animal and vegetable matter or are honeycombed with cesspools or the accumulated filth from

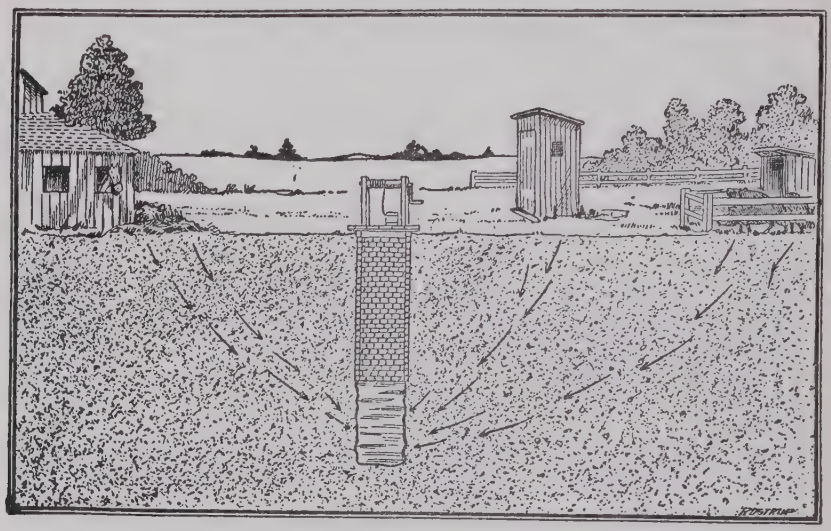


FIG. 480.—POPULAR IDEA OF HOW WELLS BECOME INFECTED FROM SURFACE POLLUTION.

broken drains, soakage from barnyards, pig sties, stables and outhouses. A well should never be sunk through such ground.

Finally, in the selection of a building site due regard should be had for the disposition of garbage, household waste, sunlight, air, dampness and ventilation. In valleys and ravines, for instance, the ventilation is not so good; hence the air may become damp and chilly. The same might be said about building a house too close in to a rather steep hillside; in the latter case it ofttimes becomes necessary to construct artificial drains at some distance up the hill from the house in order to correct excessive dampness. This is best accomplished by digging a ditch of suitable length into which a number of stones are rolled and then covered over with earth. This ditch should lead into some main drain so that it will offer a proper outlet for the seepage from the hillside above it.

SELECTING A HOUSE

From the health standpoint, the bedroom is the most important part of the house. Then, should it not be the best room in the house?—not the

largest nor the most ornate but the sunniest, the best ventilated and the most quiet, at least during the night hours?

The human body throws off much waste during the night hours and sunlight is required to purify. To keep things clean may make amends for lack of sunshine but no sweeper or mop can search out the germs and kill them as well as can sunshine.

The next most important is the ice box. When the summer time is on it will be no easy matter to keep food free from taint. Some changes in food change the taste and odor; many do not. Ofttimes food is dangerous when it tastes and smells good. Especially is this true of milk.

We must remember that babies do not have a long list of foods to choose from; it is milk or nothing with them.

A poorly drained, badly constructed or badly kept ice box means that a few times at least during the summer baby's milk will be unsafe or unpalatable.

Ice boxes do not keep themselves clean merely because they are cold. They produce odors and slime that grows well in cold water, or on the walls of an unclean but cold ice box.

Next in importance is the kitchen. However careful one may be the food will touch something here and there. The cap will be removed from the milk bottle, laid wet side down on the kitchen table and then put back in the milk bottle. Such acts will occur in spite of everything.

One cannot be dodging germs all the time. This means a need for a spotless kitchen, which means a kitchen so built that it can be kept spotless.

This is no easy matter, as the grease vapors make the dirt stick in the kitchen.

A part of proper construction is step-saving and back-saving arrangements. When the cook gets tired her back aches, and she is certain to quit trying to keep things spotless.

Next come the pantries and closets; not that they are so frequently visited or are of themselves so important, but because the custom of having them dark and ill ventilated is so nearly universal.

Two-thirds of the day is spent in sitting rooms and one-third in bedrooms, therefore both of these must be right. Insanitary bathrooms and improper kitchens are offensive out of proportion to their use and, therefore, they are of importance. The balance of the house does not count for much from the health standpoint.

A common fallacy is that large rooms are better than small. Carnally and Haldane found that a man could be comfortable with 100 cubic feet of air space if the air was changed often enough and that 800 was really an excess. Where each occupant had 2,500 to 4,000 cubic feet the air was not so good as where he had a third as much. Large rooms are dirt catchers, coal eaters and a nuisance generally, while they give poorer air than smaller ones.

Especially is it true that bedrooms should be small. But small rooms must be ventilated. We may trust to leakage to ventilate a large room but not a small one.

An ordinary wall will leak somewhere about five cubic feet of air per square yard per hour when an ordinary wind is blowing. If the plaster has

a hard finish, is painted or papered, wall leakage will be about done away with.

Not so with window leakage. On a very windy day an unstripped window will leak about 400 cubic feet of air per hour. When stripped it will leak only one-twentieth as much. The air which leaks in around unstripped windows is cold air and it falls straight to the floor. The warmer the room the quicker the window leakage falls and the more uncomfortable it becomes.

The old idea was that a room with a high ceiling was preferable because ventilation would be better. In figuring cubic feet of air space for ventilation calculation engineers have long ago learned to count all over fourteen feet as a liability and not an asset.

Where the ceilings are not over ten feet high the windows can reach entirely to the ceilings and nearly to the floor. The first detail is excellent for lighting; the second makes it easier on very cold days to warm the air which enters.

The Bohemian school building laws provide that 70 per cent of the students as they sit at their desks must be able to see the sky. The common rule in this country is that the window area must be one-tenth to one-fifth the floor area.

And then what of the radiation—not only in relation to the size of the room but also to the window and wall leakage?

Another point worth while inquiring into is whether the walls and floors are deadened and insulated. Where people live in flats noises above and below often spoil the serenity of life. It costs but little to fill the space between ceiling and floor with cinders or sawdust and to do so saves heat as well as nerves.

Outside walls built hollow and filled in with insulation save coal. They will not sweat when the humidity of the room goes over fifty; and walls that do not sweat keep clean. When walls are hard finished or painted the window leakage is reduced to nothing and accumulated dust is easily removed.

Houses with basements are to be preferred even in warm climates but the basement must be kept dry. Houses without basements have cold floors, the ground under them is not dry, and wet ground under a house always breeds molds.

The English laws provide that basement floors shall be covered with six inches of cement or asphalt and that one surface of this must be treated so as to be impervious to water. The walls are to have a vertical air space running from a point six inches above the ground level to one below the level of the cement floor. Just above the top of the air space and just below its bottom an impervious layer is to be placed—vitrified brick, slate or lead. Ground water cannot travel through the wall into the basement nor up the wall into the house. The basement, if it is to be occupied, must come two and a half feet above the surface of the ground and the window surface must be at least nine square feet.

The roof of a building is not of much service in tempering the air. The space just beneath the roof is usually hotter than that above it.

SUNLIGHT IN THE HOUSE

A room that does not get some sunshine is not fit to live in.

If you will notice the ceiling in your kitchen you will see shaggy soot collected here and there. In the main, this soot is grease evaporated on the stove and condensed on the wall. With it is some other organic matter, some harmless dirt and some bacteria. One day's accumulation is too little to be seen but the mass increases day by day until, around cracks, openings, and flues, the mixture hangs like whiskers. The cleanest of kitchens have some whiskers.

The same process, though less in amount, is taking place on every wall. The condensed matter has not so much grease in it and therefore does not show so plainly. But whether in kitchen or parlor wall dust consists of organic matter capable of decaying and of germs capable of making it decay.

So come house odors! Not always harmful but never helpful and always unpleasant. To cure these odors wash the walls and air and sun the rooms. To prevent them either the putrefying matter must be removed or else it must be disinfected. Washing can be done only at long intervals but airing and sunning can be done every day. The organic matter will no more decay without germs than eggs will rot without them. Germs make no headway where there is sunlight and air.

There are other harmful results of house occupation which call for sunshine just as much as wall dirt and house odors—the illustrations used above.

How can sunlight be secured?

By placing the house, first, so that trees will not keep sunlight out of the rooms; second, so that neighboring houses will not darken the rooms; and third, by facing it in a direction that will expose every room to some sunlight.

Houses set so as to face squarely east or west or north or south are pretty apt to have some sunless rooms. As a general proposition, houses facing east or west or north are to be preferred. So fronted, an architect can find a way to get sunshine into every room.

If there must be dark rooms the walls should be washable and they must be aired enough to compensate. See to it that the kitchen and bedrooms are not of them—the kitchen, because its walls gather dirt; the bedrooms, because the bedclothes need sunlight.

SANITARY BATHROOMS

The development of house drainage has made the growth of cities possible. It is not possible to house more than ten people on an acre of ground and have them enjoy good health unless the toilet facilities are built inside the houses.

When people began to understand this and to legislate against outside or yard toilets there was much opposition. It was argued that toilets in houses would increase discomfort and produce illness. In the then state of the plumbing art there was a good deal of force in the argument and many fair-minded people believed and accepted it. But plumbers exercised their

inventive genius. One device scarcely got on the market until an improvement was crowding it out. The present state of the plumbing art represents practical perfection.

The sanitary standards of house drainage are years ahead of those of any other feature of the house. Even the yard hopper, crude as it is, is in advance of the ventilation, heating, lighting or floor and wall construction of the houses to which they are attached. The high standard of the plumbing has served to elevate other standards and to teach other health lessons.

Customarily, bathroom walls have a hard finish, are of washable construction, hung with less molding, decorated with less claptrap and freer from dusty foolishness than any of the other walls of the house. The kitchens, sitting rooms and bedrooms ought to go to school to the bathroom.

Another lesson taught, rather incidentally but nevertheless wisely, is the advantage of having wash bowls located in close proximity to toilets. This arrangement prevents some finger-borne typhoids, some venereal diseases and some other consequences. On this point, many factories, stores and offices could advantageously go to school to the bathroom. Inaccessible, inconvenient, uncomfortable facilities might as well not exist.

And finally, the perfection of house drainage should and will stimulate the inventive genius of ventilating engineers to solution of their problems. While improved house drainage grew in response to a demand that living be made safe for those who are crowded together it has demonstrated its advantages for houses surrounded by an abundance of room. Sanitary toilets and bathrooms in country houses will help to keep the country people from moving to the city.

KEEPING THE HOUSE

How hot do you keep your house in winter?
How dry is the air?
How often do you blow out your house?
How much sun do your rooms get?
How clean do you keep your house?

The way you build your house is more important than looks. While this is entirely true it does not diminish the importance of the way you keep your house.

Guard against a hot house.

To go into a warm room for a few minutes probably will do you no harm. To stay there throughout the day may do so little harm that it cannot be noticed. To stay there days in succession will first make you languid, then distinctly below physical par and finally definitely sick.

The sickness may be called one scientific name or another; the basic trouble is bad ventilation.

Nearly everybody who speaks of flats says abusive things of them. Seventy per cent of the basis of this abuse is dry hot air.

Dry air is the curse of flat life. If some of the energy spent in complaining was spent in throwing up the windows occasionally (so that the rooms

might blow out), in ventilating better all the time and in keeping the air more moist, everybody would be happier.

No amount of air can entirely replace sunshine. The woman of the house can go out to get the light. Is it not better that she should get it in the house also? Besides, it is needed to keep the bed and furnishings pure and sweet.

KITCHENS, ICE BOXES, PANTRIES AND CLOSETS

Living rooms are usually too hot and too dry. Kitchens are usually too hot and too moist.

What is sought in a kitchen is that it be cool and clean. The kitchen is rarely a dark room in the private home. From the standpoint of being supplied with outside windows it ranks next to the company room.

In order to keep the kitchen cool it is wise to have a hood over the stove. This hood should lead straight to the stack. The room should have a ventilator into the stack near the ceiling. The hot air from around the stove goes straight up and any system which tries to take it out from near the floor is sure to fail. Nor can kitchen odors be pulled around in any unnatural way. They must go out over the stove or from the top of the room or else they will go into the house. The same thing is true of the steam.

Ice boxes must be frequently aired and sunned. There are molds, yeasts and bacteria which grow pretty well at low temperatures. Many of these are odorous. The only way to keep them down is by sunning and airing. In the winter the box can be aired all the time and this is economical and hygienic. The plan is to use the cold outside air in place of ice. The best way to arrange this is to have the ice compartment open to the outside air. When the weather gets cold the door is left open and no ice is bought. Pans of water placed in the ice chamber will freeze solid and will keep the box cold during the days when the temperature rises.

Just as you never see kitchens crowded into basements wholly underground except in some hotels and restaurants, so rarely, except in such places, do you find ice boxes which cannot be ventilated or sunned.

Pantries need to be well ventilated, dry and clean. If they are not the food goes off rapidly. Molds are more liable to grow in a pantry than in any other room. There is more food for mold in a pantry than in any other room. This means that a moldy pantry is not as clean as it ought to be. It is also moister than it ought to be.

If any room in the house must be dark let it be the closet. Dark space can be better used in this way than in any other. It is better to have air ducts in the walls and have an opening into such a duct in each closet. The opening can be made so that it can be closed. This and periodic airing will be the only health needs of closets.

COLD WALLS

One of Browning's poems, called "House," tells of a home with the front wall cut off and how the wayfarers gazed in at the rooms. While the walls

of a house may keep you and me out or even from looking in they do not stop the air from leaking in.

When the temperature of the outside air is thirty-two degrees lower than that of the inside an ordinary brick wall will leak eight cubic feet of air an hour for every square yard of wall. If a hard north wind is blowing against the wall the leakage will be much greater. When the wind is blowing twenty-four miles an hour, a crack of one-sixteenth of an inch around a window sash will leak 402 cubic feet an hour.

These rough figures teach us that air leakage through walls and around windows are things which we must think about in selecting a house. They tell us that on account of the cold air leaking into the rooms the occupants may mistake the coldness for fresh air and not keep the rooms properly ventilated.

Improperly ventilated rooms (especially when they are furnace heated or heated with a gas or oil stove) where there is no proper provision for carrying away the product of combustion mean ofttimes that the air in these rooms is charged with poisonous gases, poisonous products of respiration and disease-producing germs. This means that you may expect to find a chronic condition of low vitality followed by such winter diseases as pneumonia, tonsilitis, diphtheria and smallpox.

Does it face south? If so, the lived in part of the house may be cold in winter. Is it exposed? Can the wind get a good drive at it? How are the walls constructed? Is there any building paper between the inside and outside walls? Is there any other insulation between these layers? How is the inside wall faced? Has it a hard finish that will stop air from coming through and can be washed? Is it papered so that it stops air and can be cleaned? Has the paper been put on over old paper? Does the wall sweat? If there is a basement how are the walls there? Is there any mildew on them? Are they stained from old mildew or from old leakage and seepage? Is there an airway around the wall? Is there a "damp course" in the wall so placed as to prevent seepage?

DAMP WALLS

In the north damp walls are a menace in the summer time only. During the winter the heat required to maintain temperature is sufficient to dry the walls even though ground moisture is going into them as oil goes into a wick.

In the south, on the other hand, damp walls are only troublesome in the winter time. The summer heat dries them out.

A damp wall does no harm except by keeping alive the germs of the wall dust and making the organic matter of the dust more apt to decompose. When there is plenty of air and sunshine in a room a damp wall is no more harmful than a dry wall, for air and sunshine kill the wall germs. Therefore, damp walls are only of health importance in dark rooms. It is in basements without adequate lighting and in tenements where there is no sunlight that damp walls are productive of disease.

A solidly built wall is a good conductor of moisture. Walls wet from

rain will get wet through if the outside is not adequately painted and the rain persists. But most of the wet walls are so because of absorption of ground water. A leaking gutter allows water to drop close to the wall or a drain or ditch keeps the foundation wet.

A few layers of slate, a layer of lead or of vitrified brick a foot above the ground will prevent moisture from climbing. In the case of basement walls an airway outside the wall will keep it dry, but such airway is liable to become insanitary. A better plan is to build the wall hollow. Whatever braces cross the hollow area or cross the wall above the hollow area must be of some material impervious to water.

Damp walls mean insanitary conditions; insanitary conditions mean lack of efficiency, less likelihood of employment, therefore more poverty, bad food, bad housing and conditions tending to increase the spread of tuberculosis and other infectious diseases. The problem of damp walls, then, is all important, since its influence, especially on the younger members of the family, will have much to do with the health, comfort and happiness of the community.

CURTAINS AND CARPETS

Occasionally a method which is right will develop entirely away from its original lines. The underlying idea may be entirely changed. A good illustration of this is the use of curtains.

The first people who used curtains wanted to make it possible to keep the windows open. Curtains gave more privacy and also took some of the dirt out of the air. Then the use of curtains to adorn the room became the custom. Now curtains are made of delicate fabrics. They are no longer used to filter air. On the other hand they are so difficult to clean that the windows are kept down in order that the curtains may not be soiled. No doctor would do a surgical operation in any curtained room. Contagion cannot be cared for in curtained rooms.

Then why not get fine curtains out of the bedrooms and living rooms? Leave them in the show parts of the house—for instance, in the parlors. Let the curtains of the living rooms be plain, simple and cheap.

As between curtains and air, let us have air.

Carpets furnish an illustration of a similar point. The old-style wooden floor was cold. It leaked air. It was hard to keep clean. Dirt showed plainly on it. Then came rugs which developed into carpets. The floor was much warmer. It did not show dirt. The carpets increased in cost. The shades were kept down to prevent fading. The windows were kept down to prevent dust from blowing in.

Now there is a different idea and it deserves every encouragement. Floors are deadened. This makes them warmer. They are being made of hard wood or some impervious composition—not all of them but in increasing numbers. The corners with the side walls are being made round. And when they are covered it is with rugs. But rugs are no better than carpets unless they are kept clean.

Dust from Rugs.—*Mrs. W. J. G. suggests that leases include a prohibition of the practice of beating rugs on the porches.*

REPLY.—No good neighbor will dust her rugs in any way that sends dust into her neighbor's house. Bad neighbors render life in flats well-nigh unbearable.

A SENSIBLE CAMP

Two gentlemen in Mississippi have built an outing home along right lines. They started right by locating right. The spot selected was in the middle of a fifty-acre pasture on soil that is a mixture of sand and gravel. When it rains the water quickly soaks in and there are never any puddles of water standing around. This means no mosquito breeding places as well as no hours of mud-bound idleness and discontent.

There being no trees, the breezes are not obstructed and the sun gets a fine chance at everything. It is impossible to prevent some ground pollution around a dwelling but this matters little if the sun gets a good chance to sterilize.

The next exhibition of good sense was in the type of house built. Ninety per cent of the time in summer and 60 per cent of the time in winter the house consists of a roof and a floor. The floor is of cement. In the center is a chimney with two fireplaces. Over the top is a high pitched roof.

All four sides of the house are so hinged that they swing out until horizontal. To facilitate swinging out the side walls are divided into ten foot sections and the counterweights, made of cement, are used to balance the weight. The walls hinge ten feet from the ground.

The breezes are unobstructed. There are no side walls to absorb heat during the day and radiate it at night. Sunlight and air and an easily washed floor keep the house always free from house odors. Privacy is had by use of light, movable screens. The house is cooler than if it were placed in the woods.

The next exhibition of good sense was in providing a good water supply. Sixty feet from the house they sunk an artesian well flowing seventy-two gallons of water. Artesian water is bacteriologically pure. It is not contaminated and it cannot be.

The water run-off passes through a milk, butter and meat box, furnishing the next exhibition of good sanitary sense—provision to prevent fresh food from spoiling.

Over the artesian well is a pagoda with a cement floor. Curtains that can be dropped around this pagoda give a cement-floored bathing pavilion provided with a stream of cold, clean, running water—a shower bath proposition. This is the seventh exhibition of good sense.

The statement that when these side walls were raised the house consisted of a roof and a floor omitted mention of mosquito and fly screens extending from the eaves to the floor on all sides—the eighth item of sanitary sense.

Compare this simple, inexpensive, sanitary equipment with the usual camp under sun-excluding trees, stuck in a dense mass of foliage, on wet, soggy ground, on polluted soil, with polluted water and insects galore, with no provisions for keeping food cold and with no bathing facilities.

PORCHES

Porches can add to or detract from the hygienic qualities of a house. In country homes and sometimes in homes in smaller cities the house is so nearly surrounded by porches that the sun cannot shine into the rooms. Especially is this true of latticed and vine-clad porches. With this reservation porches are to be sought for in finding a home. This is much more necessary in a city than in the country. When houses are standing on lots thirty feet or less in size there is insufficient chance for light and air unless there be porches.

Sleeping on a porch is much more comfortable than sleeping in a room in most places from May 1 to December 1. With a moderate amount of preparation it is just as comfortable as room sleeping during April and December. With proper preparation and forethought it can be made comfortable during January, February and March.

It is much more healthy than sleeping in a room. This is true of the midwinter months as well as the months of spring, summer and autumn. Perhaps there is, here and there, a lingering idea that night air is harmful. It is both cleaner and purer than day air.

The people of southern California say that 50 per cent of their population sleep on screened-in porches. With them the percentage should be 90. Sleeping out is so easily made comfortable with them.

Much the most satisfactory arrangement is to "glass-in" the sleeping porch. This is expensive. Glassed-in sleeping porches may be made so snug and free from drafts that they have no advantages over cold rooms. If the sleeping porch is glassed-in the windows should be movable and free air movement must be had during all sleeping hours.

The next best arrangement is protection by curtains. The shortcoming of curtains is their noisiness in stormy weather. This can be prevented by fastening with strips of wood placed at short intervals. In those parts where roller curtains are used buttons, buckles or hooks should be provided at intervals of two feet on all posts and pillars and supports.

The simplest arrangement is to have a heavy tarpaulin to cover the bedstead as well as the bed. This should be rolled out of the way on the head of the bed. When storms come up during the night the covering can be arranged tentlike over the bed. The occupants sleep elsewhere on such windy, rainy nights.

The other uses of porches will appeal to more people than their use as sleeping places. Has your prospective home a good back porch where you can eat in the open air in the summer time? Does the sun reach it that things may be sunned and aired? Is there a comfortable front porch where some fresh air can be taken without dressing for the street?

ARRANGEMENT OF HOME

As one goes about seeking a home it is well to ask oneself certain questions about the requirements of a home for comfort and health, to answer the questions in one's own mind and, when a proposed location is being

looked into, to see how many of the answers apply to the place under investigation. Some of the questions which should be asked and my answers thereto follow:

Q.—What is the principal source of flies in a neighborhood?

A.—Manure boxes and stables; garbage is second in importance.

Q.—What is the principal source of mosquitoes about a house?

A.—Small collections of water located inside the house or within 300 feet of it. Ninety-five per cent of mosquitoes and flies never get 300 feet away from their hatching place.

Q.—In which direction should a house face?

A.—North. The front portion of the house is not often used constantly. On cold, windy days the north rooms generally leak so much cold air that they are uninhabitable. There is advantage in using these rooms as parlors and spare rooms. It is even better to have the house face somewhat west of north.

Q.—On which side of the house should the bedrooms be located?

A.—The east side. The beds should have the morning sun and in summer should escape the heating effect of the afternoon sun. Especially is this necessary with the nursery.

Q.—Is a house in a dense woods advisable?

A.—No. It is almost impossible to rid a house thus located of mosquitoes and flies. The sun does not get a fair chance to purify the ground around the house nor the inside of the house.

Q.—Should the house have a cellar or basement?

A.—Yes. It is a protection against cold floors in winter. It does not make the house warmer in summer.

Q.—How can a cellar wall be kept dry?

A.—A tile drain should be laid around the outside of the cellar wall. The drain should be four inches below the foundation wall, beginning at the corner, and twelve inches below at the opposite corner.

Q.—Of what material should the cellar wall be built?

A.—Of concrete or stone, laid in cement mortar.

Q.—What is the objection to a wall of ordinary brick?

A.—Brick walls absorb water too readily.

Q.—How can water be prevented from creeping up the wall?

A.—By interposing a damp-proof course consisting of one-half an inch of asphalt or slate and by having air spaces in the wall.

Q. Should the cellar extend above the ground and be provided with windows?

A.—Yes. Unless a cellar can be aired and sunned it is liable to be a source of ill health.

Q.—What are the signs of a damp cellar?

A.—Wingate's "Sanitary Question Box" gives the following:

1. Rust on exposed metal pipes and flues.
2. Broken plaster and "bucking" lath.
3. Dry rot on the floor beams.
4. Fungous growths on walls.
5. Spots of mildew and moisture between the cracks of the flooring together with a musty odor and a general sense of closeness. In addition,

look for wet dirt in the spaces of the flooring and for rotting of the ends of wood in posts that support the floor.

Q.—How can one tell that the walls of a building absorb moisture from the ground?

A.—Look for so-called wet feet. Walls that show scaling of the paint and incrustation with a mineral extending a foot or two above the ground.

Q.—Should a house have high ceilings?

A.—No. High ceilings add nothing to the ventilation of a house. In fact, they increase the difficulties of ventilation. They likewise increase the difficulties of heating.

Q.—Should not the houses in warm climates have high ceilings?

A.—No. The houses in Havana have high ceilings but it is a mistake. It is desirable to have a good deal of space below the roof but that space should be between the roof and the ceiling, not below the ceiling.

Q.—Should attics have windows?

A.—They should, especially in warm climates. Attics need sunshine. In warm weather, unless they have windows, much of the roof heat is transmitted to the rooms. In cold weather the windows can be made tight.

Q.—Can a house have too many windows?

A.—Yes. The purpose of windows is to illuminate the room, to secure for it the bactericidal action of sunlight and to permit of ventilation. Too many windows means that the room will be cold, will have cold floors and will be hard to heat.

Q.—From the standpoint of health what is the most important room in the house?

A.—The nursery.

Q.—What is the least important?

A.—The parlor.

Q.—Why is it important that the pantry should be right?

A.—Because food may be dangerously spoiled without being altered in taste, smell or appearance.

Q.—What is the most important piece of furniture in the pantry?

A.—The ice box.

Q.—What are some of the more important points to note about an ice box or refrigerator?

A.—It should maintain a temperature, when iced, of less than 55°. In comparison with this all other points are of minor importance. It should be lined by some white waterproof easily cleaned substance. The shelves and partitions should be removable. It should be drained by pipes and traps that are easily reached and readily cleaned. It should be in such a position that it can be sunned at times, or else it should be on rollers, so that it can be moved to a place where it can be sunned. It should have walls thick enough and composed of material which will not absorb moisture or pack or lose its air spaces. It must not be an ice eater. It must be open to the outside so that ice may be put in from the outside in warm weather and so that the outside air may serve for refrigeration in cold weather. Its outward appearance must be one of neatness and cleanliness.

Q.—Should the pantry shelves be removable?

A.—Yes.

Q.—Should the pantry walls have a hard finish?

A.—Yes.

Q.—Should the kitchen have a hard-finished wall?

A.—Yes. The kitchen should have a washable wall free from molding and dish racks, even if it is the only room in the house with a wall of this type. The vaporized greases soon soil the kitchen wall and nothing suffices except washing.

Q.—Should the kitchen have an electric fan?

A.—Yes, an electric fan is needed to distribute the heat properly in both winter and summer. In hot weather the food will not be sanitary if the cook is overhot and perspiring profusely.

Q.—Should the kitchen have every convenience not only for cooking but for handling the food and for caring for the dishes?

A.—Yes. Efficiency demands it.

Q.—Of what material should a kitchen sink be made?

A.—Enameled sinks are much the best. Porcelain is good. Galvanized iron does very well though it rusts after the zinc has worn off. Slate, soapstone and iron have much against them.

Q.—How can the kitchen sink be kept free from small scraps of food?

A.—Every sink should be equipped with a removable strainer through which all washings should pass.

Q.—Should the dining room be light?

A.—While it is very desirable it is not especially necessary.

Q.—How should the bedroom be arranged?

A.—There should be the minimum amount of furniture and the fewer dirt-catching ornaments and trinkets the better.

Q.—Should the floors be covered with carpet or rugs?

A.—Rugs.

Q.—How should the floors be built?

A.—Between the floor and the ceiling of the room below there should be enough deadening substance to silence all sounds else the floors will be cold. Where floors are not deadened the flooring shrinks unevenly and in time it draws and creaks.

Q.—How should the floors be cleaned?

A.—The house should be equipped with vacuum cleaners whenever it is feasible.

Q.—What is the objection to beating rugs and carpets on the outside?

A.—The noise disturbs the neighborhood; the dust pollutes the air and the bacteria kill the rug beaters.

Q.—Should the bed be set against the wall?

A.—No. One's smell tells him that the air on the side of the bed next the wall is not fit to breathe. Crowder has proved it by analysis.

Q.—Should the bed be put in an alcove?

A.—No. The bed should be where sunlight and air can get at it.

Q.—Should a house have sleeping porches?

A.—It should. When one sleeps in cold circulating air in a room which has had an abundance of sunshine during the day hours he will find that there is a material increase in his working capacity and also that he will be less liable to colds and pneumonia.

Q.—Is a glassed-in porch better than one with awnings, curtains or shades?

A.—It is.

Q.—Are glassed-in porches with fixed windows and radiators advised?

A.—No. Unless the windows can be opened, the air allowed to come in freely, and the temperature to drop the porch loses many of its advantages as a sleeping place.

Q.—Where should the bathroom be placed?

A.—Convenient to the bedrooms.

Q.—Should the bathroom have a window opening to the outside air?

A.—It is desirable but not necessary.

Q.—Is it proper to put a bathtub, a wash bowl and a water closet in the same room?

A.—It is.

Q.—Should a bathroom be heated by a gas heater?

A.—It is never to be desired. It should be permitted if the heater has a flue or pipe to the outside air. Gas heaters without flues should not be allowed in bathrooms.

Q.—Should a bathroom have a wall thermometer?

A.—Yes.

Q.—What is the reason for special care as to the temperature and the air conditions of the bathroom?

A.—The disrobed body of the bather requires that the temperature of the bathroom should be several degrees warmer than the temperature of the remainder of the house. On the other hand, fainting in the bathtub must be provided against by watching that the temperature of the bathroom does not go too high and that the air is not too much polluted by products of combustion.

Q.—What type of closet should there be?

A.—Syphon jet, syphon, or washdown. Washout or hopper closets are not satisfactory.

Q.—Are the present plumbers' methods proper from the health standpoint?

A.—They are.

Q.—How can the air from an open window or from a hot-air register be cleaned?

A.—By fastening cheesecloth over the opening.

SPRING CLEANING

Spring cleaning is a law of nature. As the glow of spring banishes the winter's chill everything in nature casts off its winter coat, worn and dirty from use, and takes on clean raiment. The Easter bonnet is but a poor response to the great nature call. The trees shed their old dead parts and new clean buds break out. The flowers displace the dirty coverings, the dead grass is washed away and a bright green carpet covers the earth. Nature cleans in the spring.

Spring cleaning is an instinct. The animals tumble the winter's waste

out of their lairs. The birds that during the winter have accumulated dirty coats are seen to spend hours in washing and cleaning their feathers. The old drake that has been contented to look like an ashbox will give up hours to drawing its feathers through its beak, cleaning and oiling them.

Spring cleaning is a custom and always has been. The cave man had the habit of cleaning himself and all about him in the spring time. Back of his custom lay the customs of his ancestors; back of the customs of the ancestors lay the instinct of the animals; back of this lay the laws of nature.

The groups of women who in the spring of this year will be organizing clean up movements are not illustrations of De Vries' "Mutations" or "Sports." They are in harmony with the eternal fitness of things. They are links in a chain that reaches back to Noah and his ark laws, to Adam, to the cave man, to dumb animals, to nature itself.

The beginning is with the house. All winter long the waste has accumulated there. The housewife has done her best. She has cleaned each day, each week, but the task has been too much. The sun had a short day and could not kill all the offensive matter in all the rooms. The air was cold and could not be allowed to sweep through and do its full share of cleaning.

Therefore each week the standard of household cleanliness has gone back just a little. If it were 1,000 in October, in November it had fallen by easy stages to 990 and so on until easily and gradually it became imperceptibly lower as the winter went on.

Now May comes and by one prodigious effort it must be brought to the normal again.

The shutters are thrown wide open; the rooms are bathed in sunshine; the windows are thrown open; the rooms are bathed in air.

However, more than that is required to make up for the sins of the winter. So up come the carpets and out they go to a vacant lot where some poor fellow beats them. He stands in a cloud of dust striking away. It is too bad that the principle of vicarious sacrifice should be carried so far.

Statistics show that janitors and carpet beaters die from consumption like flies in autumn. Though it cannot be shown by statistics they revel in colds during the spring cleaning season. How could one expect anything else? There they stand, day by day, breathing in the germ laden dust, the dust that the housewife knows she must get rid of if her family is to keep well.

The scoffer says: "Have you not told us that sunlight and air kill germs; that drying makes harmful things harmless?" Yes, they do. Given a million germs and admit these agents would kill five hundred thousand of them, there is still danger to the rug beater.

The danger of carpet dust, though, lies in the fact that not all janitors die from it, and none of them drops dead as he beats. If they did carpet beating would stop at once.

If the babies all died, or if babies died instantly, from bad milk, bad milk would be a matter of no importance to the community. Everybody would stop using it.

Cannot a better way be found?

If there is something to be said against the prevailing practice in carpet

cleaning nothing can be said against washing and scouring the walls and floors, the closets and pantries, the sinks and ice boxes.

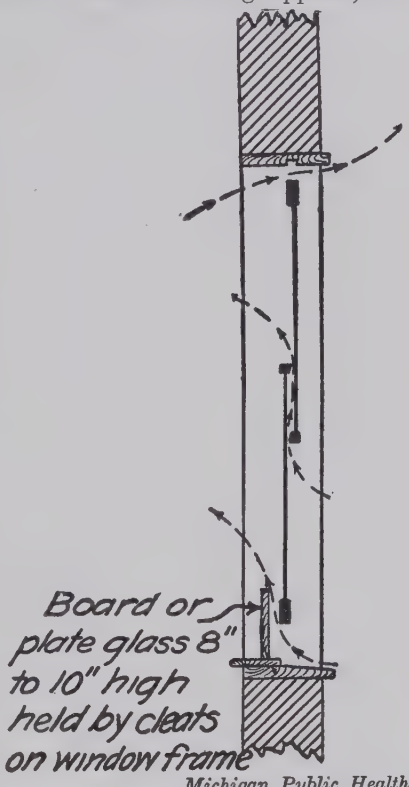
Spring cleaning assumes a rather broad scope. It has for its object not only cleanliness but the laying plans for protection against disease that comes with the approach of summer.

The doors and windows of the average home have usually been kept closed during the cold, bleak days of the winter. The air in many such homes is more or less foul; dust and dirt have accumulated. The attic and closets have been overworked by the accumulation of useless wearing apparel, old papers, paper boxes and odds and ends. The ceilings, especially of the closets, have become dust and dirt laden. In smoky neighborhoods particularly the paper on the walls is dirty and greasy from coal soot.

During the last days of the winter the good housewife and the good husband have planned for a spring cleaning. They have faced the problem of cost and combined their best judgments in arriving at conclusions as to what shall and what shall not be done.

Unfortunately, all of us cannot step to the phone, call the vacuum cleaners to take an order to clean apartment at No. — or home at such a location. While it is the ideal method of cleaning it is too expensive for most people, and necessitates their resorting to soap and water and hard labor.

When the wife and husband planned their spring cleaning they were not wholly influenced by selfish motives. They might leave some things undone. They might get along without such extensive cleaning. But their neighbors have rights. They do not want to maintain a menace to the health, comfort and happiness of their neighbors. Hence they have endeavored to be more liberal in their calculations.



Michigan Public Health.

FIG. 481.—VENTILATING BY MEANS OF WINDOW LOWERED AT TOP, RAISED AT BOTTOM, WITH DEFLECTOR.

There is no better way, no more economical way, no more effective way to spend money than in maintaining a clean, hygienic home.

The best way to clean a house is to begin with the closets. See that they are thoroughly cleaned and put in order before anything else is undertaken. Next, empty and clean bureau drawers, take down curtains and portières, clean and put them aside until the cleaning and decorating has been completed. Bric-a-brac and pictures should be cleaned and placed where they will be protected until the carpets and rugs are laid.

House cleaning, as usually referred to, has regard only for the dusting of pictures, bric-a-brac and books, wiping the dust from the walls, beating the carpets and upholstered furniture and rugs, hanging the mattresses and bedding in the sun all for a few days each year.

However, house cleaning should have for its object a little more than this. It should mean getting the house and its immediate surroundings into a hygienic and sanitary condition.

Insects are carriers of infection. They are responsible for many epidemics. They may carry the germs of typhoid and typhus fever.

The mosquito carries the germ of malaria, the bedbug carries the germs of relapsing fever, fleas may carry the germ of many diseases. The damage that the common house fly does by carrying disease laden filth on its feet is pretty generally understood.

The necessity for thorough spring cleaning seems to be only too apparent. Every corner, every niche should be thoroughly cleaned and freed of vermin.

Cockroaches and all fields which offer good breeding places for them should be destroyed. Containers to foods should be provided to bar their entrance.

These pests may have paid a recent visit to some outhouses where they crawled over disease laden feces, only to return hastily to your kitchen and crawl over your bread, cake and other articles of food. They are kind and considerate enough to leave the germs of typhoid or typhus fever.

Roaches have an especial liking for dark, dirty, damp corners in the kitchen and about the pantry. For this reason extra care should be used when cleaning and repairing in the kitchen and pantry to provide against the possible invasion of the cockroach.

In rural districts the houses may not contain so much dirt as the homes in the great cities but there are outhouses such as barns, chicken houses, pig pens, cow pens, stables, smokehouses and wagon sheds which need thorough cleaning.

In the spring cleaning season they should all be carefully gone over. All the débris and waste which favors the breeding of vermin must be destroyed.

It should not be forgotten that rats, mice, flies and fleas are especially partial to fields of filth that are located in and about such areas. They are all carriers and spreaders of disease; and if the home is to be free from disease breeding vermin their habitations must be destroyed.

It has been known for some time that the mosquito is the carrier of the malarial poison. No disease so insidiously and secretly undermines the constitution and decreases physical efficiency as malaria.

To do away with the mosquito it is important that cesspools and mosquito breeding habitations be destroyed. Mosquitoes breed in water tanks, tin cans lying about the yard, barnyard, in the street or road, in barrels used to catch rain water or that for some other reason contain water, and in cisterns and flush tanks in toilet rooms.

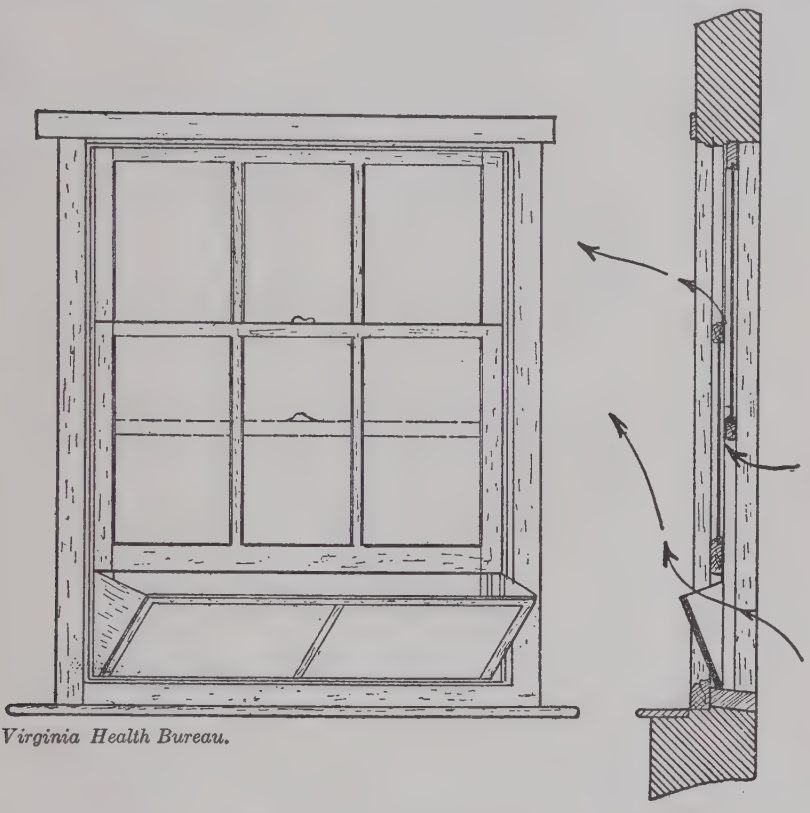
The water tanks, cisterns and flush tanks should be covered to keep the mosquitoes out; tin cans or other receptacles containing water and lying about the yard, barnyard and streets, should be gathered up and carted away to the dumps.

To prevent the development of mosquitoes in dumps the rubbish should be treated with crude petroleum or coal oils.

Where swamps exist within a given radius of a home they should be drained. Where there are filthy cesspools they should either be filled up or treated with some sterilizing agent, as lime.

It may be necessary to treat the swamps with crude petroleum or coal oil. If it is necessary, it should be done.

Flies carry disease germs on their feet, gathered from feces, sputa, dead



Virginia Health Bureau.

FIG. 482.—WINDOW VENTILATOR.

animal matter and infected discharges. The germs they deposit on the food over which they crawl or the moist surfaces of the body are often the starting point of a serious epidemic of some one of the many contagious and infectious diseases.

Spring cleaning then should have regard for placing the home and outhouses in such condition as will reduce the fly-breeding places. All garbage cans or containers should be thoroughly cleaned, repaired and equipped with an appropriate and practical cover. This will make it easier for the housewife or other person who wishes to deposit garbage or other waste material therein and insure proper protection of such waste material against exposure to flies.

Manure boxes may become a serious menace to public health, as they furnish an ideal place for flies to breed. In their construction, therefore, regard should be had for the exclusion of flies, insects and rats.

Manure bins should be carefully cleaned and in the rural communities, manure piles should be hauled away, since they are often within the field of some watershed from which the family well may draw some of its water supply.

Where it is possible and practical the manure boxes, cellars, pig pens, chicken houses and the inside of outhouses should be whitewashed. Lime should be sprinkled freely about the area.

Flies and mosquitoes must especially be guarded against as they are the most common carriers and dispensers of disease producing germs. After the house has been thoroughly cleaned and refuse containers thoroughly sterilized and rendered sanitary flies and mosquitoes should be further guarded against by proper screening of the house. Dr. Rosenau has said:

"When the matter is generally understood it will be a greater reproach to the housewife to have mosquitoes and flies in the house than bedbugs."

House Doctor Needed.—*M. L. H. writes: "Our house contains a living room and three bedrooms on one floor, an attic above, and a basement containing a dining room, kitchen, and two rooms used for storerooms. In one of these shoes in a short time are covered with blue mold and in the other room tins and pans rust quickly. The dining room and rooms above have been decorated twice in three years. A whole side of paper and putty coat will come off together. The decorator says it is on account of the dampness. A furnace heats the rooms very well except in severe weather, but it does not heat the kitchen, where we have a gas range for cooking and a coal range for heating. The floor always strikes up through the feet cold and clammy, although there are rugs all over it. The grandmother puts on alaskas to go to the kitchen. A jelly-like substance oozes up through the cracks of the hardwood floor in the kitchen, so the decorator said he had better give it two coats of paint. That was during the extremely hot weather last summer. It was over three weeks before the second coat could be put on, and that was even longer in drying. The decorator said the boards were so wet on the other side they could not absorb the paint. In the corner near the sink the floor seems so cold we have boards on the floor and covered with carpet. We thought the pipes must leak, but the plumber says that is impossible. Could we require the landlord to take up the floor and examine conditions below? Is it unhealthy to live in such a house, and are we laying the foundations for rheumatism?"*

Reply.—Yes, you are laying the foundation of ill health, and probably of some infection like rheumatism.

Your house needs a house doctor—first to diagnose and next to cure. At the beginning it should have had a house doctor to prevent, for preventive house medicine is as much better than curative house medicine, as preventive medicine is better than curative medicine for folks.

The jelly-like substance which oozes up is mold. Molds are certain to grow in such a house. Continuous sunlight would be required to prevent it.

The trouble with the house is that the walls and floors are not insulated. Ground water travels up the walls. A six-inch cement basement floor with a hard finish, a layer of impervious material—slate, lead, vitrified

brick—above the ground in all walls which reach the ground, deadened floors and room walls in which there is deadening and on which there is a hard finish—such would be a correspondence course diagnosis and treatment.

Space in Tenements.—*J. I. F. writes: "Referring to your article on housing, I venture to suggest that in addition to sanitarians, architects, and political economists, whose counsel is to make effective committee work for better homes, the advice of several practical women would be of invaluable aid. My own experience in poor neighborhoods, as a settlement resident, visitor, etc., tell me that from the house (home) keeper's point of view several things besides light and air and good plumbing are essential.*

"I believe it necessary and practical to have a certain amount of shelving in the kitchen, and, as I know that every inch of space is paid for by the tenant, this shelving need not take extra space, but can be made sightly by corresponding to the plate rack in costlier homes, and hooks can be attached.

"Above the second floor, the home that has not some little porch where a baby buggy may be placed, or a little child, properly guarded, may play, is by that much incomplete for the mother. She must hold the little one or give her time by taking it to the ground floor, or else intrust its care, frequently, to some one too young for that responsibility.

"The wall space in many new buildings could be better arranged by placing windows and doors in juxtaposition, so that currents of air could cool the rooms on hot days and purify them in all seasons.

"Finally, I believe that, through agitation, it might be possible to induce some builders of tenement property to put up buildings as we see them on modest streets in the Humboldt Park and Logan Square neighborhoods, on the checker board plan—one or two houses at the rear end of the lot and the next touching the building line. This arrangement secures light, air, and garden space, and I believe is capable of much improvement, so that the landlord can be assured of a fair return on high-priced property.

"While conditions are not so bad as in New York, they are in great need of improvement, and I hope we shall soon see some tangible results and that women will be allowed to help in solving these problems."

REPLY.—This letter contains many valuable suggestions. It is published in order that they may be more widely circulated.

Safe but Wasteful.—*R. C. writes: "Will you kindly tell me if a stationary porcelain tub, not in a basement, is a safe ice box, when kept absolutely clean? Should the stopper be left out?"*

REPLY.—It is safe enough. The stopper may be kept out. It will waste ice. Much of the cold will be used up in chilling the air of the room.

Sunlight in Bedrooms.—*E. M. writes: "Are bedrooms with northern exposure, that never have the sunlight, any less healthy than those that do, provided they are well ventilated from the outside?"*

REPLY.—Bedrooms which get no sunlight are not as healthful as those which do. If the ventilation and cleanliness standards are raised high enough the harm from lack of sunlight is negligible. If the sunshine standard goes down and the ventilation and cleanliness standards do not go up to a compensating degree the harm is material. A bedroom getting no sunlight will be safer if it has plain walls without moldings or shelves,

doors and windows without projecting frames, rounded corners, hardwood floors and simple furnishings. The windows should be thrown up and the room aired out during some part of the daytime. They should be open during the hours of sleeping.

Poor Lighting in Hotels.—*Mrs. W. J. G. writes: "1. Are there laws in Illinois governing the amount of light to be furnished guests in rooming houses and hotels? A man not long ago complained of his head aching and eyes feeling strained on account of the poor light in his room while reading (studying) evenings. The lights in the parlor and office, he said, were better, but these places were too noisy for one to read or study in. 2. Is it not a fact that such conditions need to be remedied?"*

REPLY.—1. There are no such laws. The laws of competition do not even cover the case. One of the prominent monthly magazines had an article on this subject a few months ago. It was written from the standpoint of the traveling man. One of the complaints was of the universally poor lighting of hotel rooms. The lights, he said, are never where they are needed.

2. Yes.

Cleaning the Sink.—*E. T. W. writes: "Kindly inform a young housekeeper how to keep the sink and toilet always clean and what to use. Someone says to dissolve a little copperas and pour down twice a week. Is that good?"*

REPLY.—I do not think copperas would help much. The first necessity is that outside parts be kept as clean as possible. For this purpose hot water and soap, particularly the soaps having an excess of alkali, suffice. Pipes from sinks clog with chilled grease and dirt. What is needed to cut this is heat and alkali—hot water and lye soap or some of the other very alkaline soaps. If any part of the clogging is from the growth of moldy slimes strong ammonia cuts it. Clean out the grease and dirt and antiseptics will not be needed and their use will not help. Some precipitates composed of grease and salts from the water can be cut best with a sand soap. For bath tub stain a cloth moistened with kerosene works very well. For toilet discolorations alkali soaps and ammonia are usually efficacious. Sand soaps are frequently needed; sometimes plenty of alkali soap applied with a stick or an old case knife will be necessary. If the flush is not forceful enough or the traps do not keep full and odors result the plumber must be called in.

No Sunlight in Bedrooms.—*S. J. writes: "That new idea that perfect health cannot be had without sunshine in bedrooms is incorrect. If you are not healthy do not blame it on account of having no sunshine in the bedroom. I know a family who had sunny bedrooms, but the members were sick and consulted doctors and used all kinds of medicines. Then they moved into a building where they had no sun in their bedrooms, and at the same time bought a book called 'The Nature Cure,' and also read the Chicago Health Report, written by Dr. W. A. Evans, and are still reading Dr. Evans' writings, and not only reading but living thereafter, and the result is perfect health without doctor and medicine. How did the members of said family cure themselves without sunshine in their bedrooms and without doctor and medicine? They sleep with their windows open at top and bottom all the year round, without heat in the bedroom, and, as they get*

out of bed they throw the bedding over the back of the bed and leave the room with the windows still open for hours, and dress in a heated room. After the bed is well aired they close the windows and open the door to the heated room, and when the bedding is warm the bed is made up. In the summer the bedding is brought out in the sun a couple of times a week. And they drink plenty of water at about the same temperature as the body the first thing in the morning and the last at night, get plenty of regular sleep and bathe at least once a week, and only eat and drink what agrees with them three times a day, and sparingly at that. Laugh heartily the first thing in the morning and the last at night, and don't kick or grumble; it hurts. It is said cleanliness is next to godliness, and I believe it. Be good to yourself and you obey God."

REPLY.—The plan is most excellent.

CHAPTER LXI

Ventilation—Heating—Humidity

VENTILATION

VALUE OF FRESH AIR

Ship stokers, iron and steel workers, furnace men, and some others must do their work in places where the air is sizzling hot. Bakers and cooks work where the temperature is higher than is healthy. Such men suffer from heat exhaustion and heat cramps, sometimes one feature predominating and sometimes the other.

The affected man seldom has the high fever of sunstroke. On the other hand, the temperature may be below normal and the skin pale. The muscles are unable to get rid of the waste—lactic acid—and they spasmodically contract or become sore. The usual attack lasts a few days and then recovery ensues. Rarely is it fatal. Most men who suffer from it feel lassitude, a muscular soreness—"a touch of muscular rheumatism"—whereupon the man loafs on his job for awhile and gets well about as mysteriously as he got sick.

No workman can afford to work in a hot place where there is no provision for keeping him well. Just as certainly no employer can afford to work his men in a place where the air is hot and wet and still.

I have sometimes wondered why iron is made in sheds and why foundries always have broken windows. There's a reason—and the small boy goes free.

It has been found that besides heat two other qualities of engine room air are harmful—high humidity and stillness. A wet bulb temperature above 85° F. causes the workmen to have fever. It is important to watch the ordinary or dry bulb thermometer. It is more important to watch the wet bulb thermometer.

I wonder how many foundries, rolling mills, engine rooms, kitchens and bakeries have wet bulb thermometers. And yet the readings of this instrument will furnish a good index of how much work a man will do in a day as well as some sort of a rough index of how many sick days he will have and how many years' labor.

If the air is both hot and wet its harm still will be decreased if it is kept in circulation. If the air next the workman's skin and nose, after it has taken up as much heat, moisture, and bodily waste as it can, is replaced however by fresh air ready to take up its load the workman will suffer less harm.

Surgeon Fiske of the United States Navy told the Congress on Hygiene that in our haste to build the White Squadron we forgot these things and that our sailors suffered heavily. Now our battleships are being provided with

ducts and fans capable of throwing a great volume of air into the hold and the efficiency rate of the sailors has risen.

VENTILATION AND EFFICIENCY

Not long ago the chief surgeon of a certain railroad (who is the only employee with any information on sanitation) came in to see me with blue prints of the division superintendent's office at a certain point on his road.

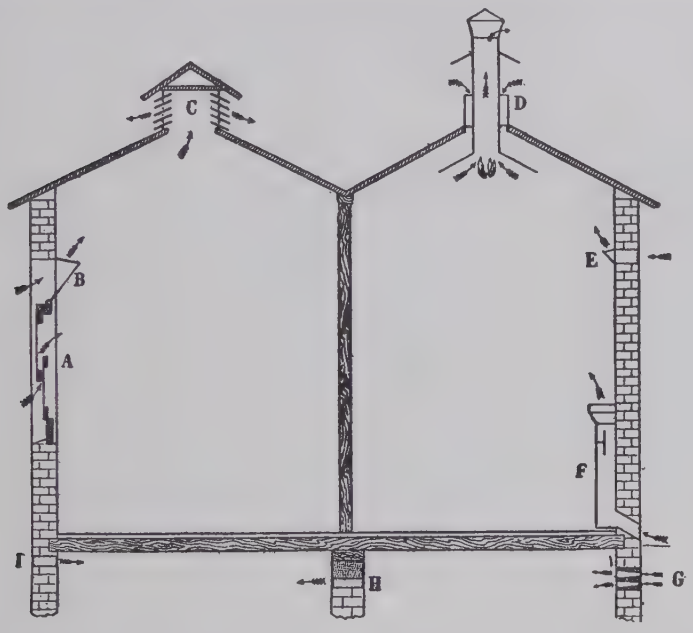


FIG. 483.—DIAGRAMMATIC SKETCH OF VARIOUS PROVISIONS FOR VENTILATION. A, Sash window with Hinckes-Bird's arrangement. B, Hopper sash-light falling inwards. C, Louvred outlets. D, McKinnell's ventilator. E, Sheringham's valve. F, Tobin's tube (showing valve open). G, Ellison's conical bricks. H and I, Grid ventilators below floor joists. (From "Hygiene and Public Health," by Drs. L. C. Parkes and H. R. Kenwood, London, H. K. Lewis, Philadelphia, Blakiston, 1911.)

What was originally one large room on the second floor had been cut up into about a dozen smaller rooms.

Incidentally I want to say that a large part of the insanitary premises to be found everywhere is the result of making over a house so that it can be used for a purpose not contemplated when the house was designed.

These rooms each have 2,000 to 3,000 cubic feet of space and each is occupied by three or four men. Each room has outside windows and those on the corner have outside windows on two sides. The use of "tissue" makes it necessary to keep the windows down both summer and winter—that is to say, strong currents of air blow "tissues" around and the men solve the current question by keeping the windows down.

On the east side of the building are the toilet rooms and these communi-

cate with the hall by a door and transoms. When the wind is from the east the odors are carried into the offices.

The rooms are heated by steam which circulates in pipes arranged along the outside walls below the level of the window sills. The amount of air space per person is 400 feet in some instances and 800 in others. In this estimate no allowance has been made for the space occupied by furniture and fixtures.

There are no records to show the temperature or humidity of the room

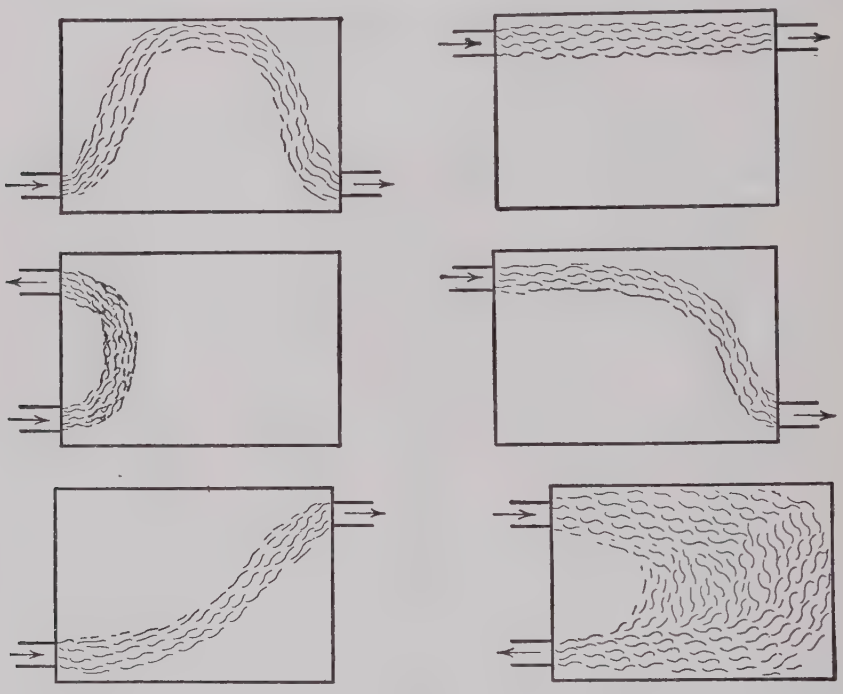


Fig. 484.—The Position of Inlets and Outlets, and Their Relation to the Air Currents in a Room.

or any part thereof at any time. The men complain quietly that they are uncomfortable and logy and they think the ventilation conditions make against health though they could not say just what proof they had of their conclusions.

The above condition is so commonplace that it is scarcely worth while using the white paper needed to print it on. There are thousands of similar places. Having started the recital, I may say there are hundreds of thousands of men and women who could have supplied the details and wound up by saying:

"We know all about such places; we work in them."

Had I said then that the employer loses money on every person forced to work in such a place the multitude probably would have replied that they gave honest service and they could not see where they could have accomplished more—which is just the point.

A full day's work cannot be done and the man who falls short cannot see how he could have done more. He could not. The heavy, still, hot, humid, foul air took the snap and eagerness out of him. He did less and was satisfied. The (say) 5 per cent clipped off of efficiency by bad ventilation bulks larger than any other loss suffered by the railroad.

The problem of ventilating exists by reason of the problem of temperature. When there is no temperature problem there is no ventilating problem. Under a few circumstances the problem of ventilation is complicated by the problem of cooling; under most circumstances, and particularly in the winter time, the problem of ventilating is a problem of heating.

In the summer time the maximum comfort is secured by raising the windows. Thus without thought or special planning ventilation takes care of itself. As a result colds are few, pneumonia is at its lowest, scarlet fever, diphtheria, measles and smallpox inconsequential as compared with the winter—the season of poor ventilation.

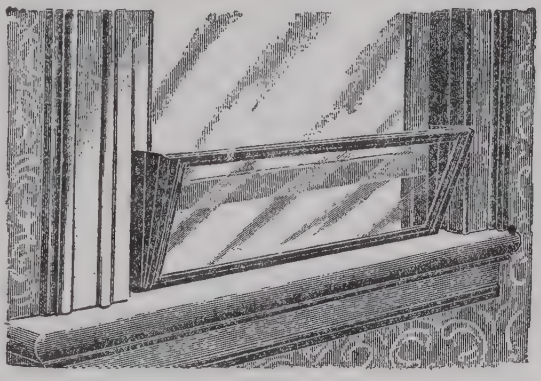


Fig. 485.—Window Ventilator with Deflector.

In the cold weather, unless there is planning, the maximum comfort is secured by closing the windows.

The principal reason for heating a room is to heat the air. The people are makers of heat, not users of it. They make enough heat to heat their bodies and to heat all the air breathed in. In addition, they are fairly good stoves for the air of the room.

The inside walls are just about neutral. They sometimes feed a little heat to the room; they sometimes take a little heat from the room; but they never affect the temperature much one way or the other.

If the house has a snug basement the floor soaks up a little heat from the room. If the boiler is under the floor the floor is a source of some heat. Nevertheless, the floor is just about neutral.

The outside walls lose much heat on cold days. They stand midway between the cold of the outdoors and the warmth of the indoors. On the outside the air is trying to cool the wall down and on the inside the air is trying to warm it up.

How much of a tax the outside wall is to be on the heat of the inside air will depend upon its thickness and the material of which it is composed. The parts made of glass will be a great tax; the parts of brick, mortar and plaster will be less so. But much more of a tax than the outside wall is the incoming air.

In a room (from the heat standpoint) you have the floors, ceilings and inside walls as about neutral, the people as credits and the outside wall and the incoming air as debits. The problem of heating is to add enough steam, hot water, hot air heat or direct radiation to balance the account.

It is important that the heat should be applied where it is needed. Above all it is needed where the cold air comes in. Second in importance is that it is needed where the cold walls are. As outside walls always leak some and usually leak a great deal the heat is needed near the outside walls.

As the windows are the coldest part of the wall it is proper that the heat should be under the windows. So far our railroad friends are right—they string their heat in pipes around the walls.

However, the chill that comes from the walls is of small consequence as compared with the chill from the incoming air. Therefore the really important point is so to place the heat that the incoming air is warmed before it comes in contact with the people.

Nor is it necessary that all of it should be thus heated. If 80 per cent of it be heated it will rapidly warm up the small amount that comes in cold.

Cold air is heavy and warm air is light. Cold air falls to the bottom two feet of the room.

It happens that that part of the room is inhabited by that part of the body which has least cold resisting power.

The legs are masses of muscle. Most of the heat of the body is made up of muscle. When a person is walking the legs are the twin stoves. When a person sits quietly the legs are cold stoves. When one sits quietly at a desk, studying or keeping books, much of the blood is short circuited out of the legs and the cold stove becomes colder still. Now, when cold air pours in through the windows and falls on the lowest two feet in the room we have cold, almost bloodless feet, bathed in cold air.

I have seen as much as ten degrees difference between the temperature of the air up next the ceiling and that next the floor. A difference of six degrees between the temperature of the air around the head and that around the feet is not unusual and that adds to the short circuiting to which allusion has just been made.

If the room is cold all over it may not be uncomfortable but there is no escape from discomfort when one's head is in a temperature of 70° and one's feet at 60°.

We hear a lot about drafts. About all there is to the draft proposition is indicated in the above idea. Moving cold air is somewhat more chilling than still cold air.

In the series of rooms the amount of air space per person is ample if there is provision for supplying them with plenty of air properly warmed. Ten times as much space would not be enough with no provision for supplying fresh air. A tenth as much space would be enough if the provision for supplying fresh air were perfect.

It is better, of course, that people should not be closely crowded together. If they are not badly crowded the ventilation can be rather poorly provided and not much harm result, whereas if they are jammed up close and the ventilation is poor the harm is great.

As space costs money why would it not be good business judgment to provide a good air supply and put ten people in a room uncomfortable and unhealthy under present circumstances when four occupy it?

So far as this particular office is concerned the plan would be to conduct the cold air from the window to the coils along the walls and to discharge

the air in such a way that it would have to pass over the coils before it escaped into the room; then to have some electric fans somewhere to draw the foul air out of the rooms.

The best place in that suite of offices is in the windows of the toilet rooms. Exhaust fans located at those windows would make the toilet rooms an area of low pressure and would induce a flow of air from the offices to them.

To supply the low pressure thus induced in the offices air would flow into the rooms from the outside, thence over and through the heat coils.

Perhaps one set of exhaust fans would not be enough. That is a point for the fan man to work out. It would have to be determined by how well the house is shielded against the wind, how free is the communication between the rooms and such questions.

A better arrangement still would be fans to exhaust the foul air and other smaller fans at the inlet windows to pull in the air and send it just where it is wanted. With the force that the small inlet fans develop the incoming air could be both warmed and cleaned before it is discharged into the room—a point that is worth considering in a railroad office.

Under such a plan the air down near the floor would be but a few degrees lower than the air next the ceiling. It would be but a degree or two lower than at the head zone. In consequence the room would be comfortable.

Of more consequence is the fact that the men would be less liable to colds, coughs, neuralgia and rheumatism. They would do more work in a day and the number of men to each room could be increased.

From time to time the windows can be thrown open and the rooms blown out. Nothing takes the place of that. When it is done several times a day the men feel better, are healthier and can do more work.

To chill and freshen all the air in a room, the occupants meanwhile standing up or otherwise exercising for a few minutes, is a different matter from the constant letting in of a little cold air which immediately falls to the floor and stays there.

Whatever method of ventilation is employed there must be arrangement for periodic blowing out. If any system does not allow of this procedure there is no further need of discussing that system. This one point alone is enough to condemn it.

Finally, these offices should be equipped with thermometers and hygrometers. The chief clerk should arrange to have an hourly humidity and temperature record kept. This record should be placed on the desk of some responsible official every morning. This bit of bookkeeping is essential.

ERRORS IN VENTILATION

The first ventilation laws were based upon the cubic feet of space per person without any regard to air changes or the condition of the air.

The next step in the evolution was that requiring a certain volume of air per person per hour.

The next step is to combine the space requirement with a volume of air requirement and to add other provisions such as that the temperature shall

be kept within bounds, the humidity within limits, the carbonic acid gas below a certain percentage and the dust under control.

It is because ventilation practice has not applied these last provisions that it has failed.

One of the most frequent statements which we hear of ventilation jobs is: "We put in 2,000 cubic feet of air per person per hour." A number of years ago the British Parliamentary Commission on Ventilation reported that it did not make so much difference how much air you put into a room as it did how and where you put the air in. And now the Chicago Commission on Ventilation comes forward with this:

"Resolved, That the putting of a given volume of air per hour per person into a room does not necessarily constitute ventilation."

The demand that a given volume of air must be put in a room for each person was arrived at by mathematical calculation as to the amount of air needed to dilute the carbonic acid gas produced by the occupants to a point less than what was supposed to be the harm point.

The ventilating engineer discovered a long time ago that when he had to remove odors or excess of heat or steam he must remove it as directly as possible; and he devised all his apparatus on that basis. But carbonic acid gas was supposed to be different somehow and instead of trying to remove it directly the effort was to dilute it.

Almost as an essential part of the plan of dilution there came the location of the outlets at the floor. However, this last provision was largely based upon an error in physics.

The ventilating engineers were told to take the foul air out of the room low down because carbonic acid gas was heavier than air and settled to the floor. Thirty years ago books on physics made this statement. They instanced foully ventilated rooms in which dogs toppled over while men survived, the reason being that the dogs were breathing two feet from the floor while the men took their air from five feet up. Such statements found their way into books on hygiene and then ventilating engineers based their practice on them.

The fact is that gases do not settle out. Carbonic acid gas tries to diffuse evenly. When men are breathing in a room the carbonic acid gas is slightly in excess of the ceiling and near the outlets wherever they are. But remove the men from the room or stop all air currents and within ten minutes the carbonic acid is evenly distributed.

Now, having the outlets near the floor does keep the floor warmer and does keep the coal bills down, other things being equal. But bad ventilation is too high a price to pay for warm floors and lowered coal bills, especially as there are other and better ways of getting these results.

It is essential that the public should understand that the present method of ventilation is both inefficient and unnecessarily expensive.

Now I shall explain the reason for this last statement. If one were to write a ledger account of room heat he would enter the occupants and heating as large credits, the floors, ceilings, and inside walls as very small credits, or even as small debits. The large debit item is air, though windows and outside walls are of some consequence.

It costs to heat 2,000 to 5,000 cubic feet of air per person per hour but

when the principle of dilution is abandoned the quantities required are lessened. Winslow says 700 cubic feet per person per hour is enough. The new Chicago ordinances in some instances call for as low as 350 feet. In addition a good mechanical engineer will arrange methods of using the surplus heat of the outgoing, hot, vitiated air to warm the incoming air.

When the principle of dilution is abandoned and the effort is made to remove the foul air as directly as possible the amount of air required will drop to less than half of what it now is and the cost of ventilation will drop proportionately.

If the quantity of air used is not the test of efficiency, what is? The percentage of carbonic acid gas, the temperature, the humidity and possibly its harmfulness as determined by the method used by Rosenau of Harvard—the quality rather than the quantity of air.

For the next shortcoming of ventilation the hygienist is less responsible; that is the stillness of the air—its freedom from drafts and currents. Some hold that "draft cranks" are responsible for the demand that ventilation shall be free from any appreciable air movement. It would be fairer, however, to say that the public sentiment responsible for this requirement is due to insufficient study of the problems of temperature and velocity of the air at the inlets.

As a result of this demand ventilating engineers strove to produce a morguelike stillness, only to learn that "still air" is dangerous. What they are now told is that the air must be kept on the move; that where fans are needed in summer they are needed in winter; that moving air is comfortable provided it keeps within a certain number of degrees of the temperature of the human body.

The stock statement as to ventilation is: "We introduce so many thousand feet of washed and tempered air and the room is free from drafts."

As to washing the engineer has made good. He can and does reduce the dust and bacterial content of the air in a very satisfactory manner. Incidentally I may say that when he is called upon to remove the dust within the room made by manufacturing processes located therein he succeeds.

If tempering means humidifying or drying the air the people have so recently begun to think of humidities that the engineer has rarely planned to control them.

But "conditioning" is the term usually applied to humidity, and "tempering" is used as meaning heating or cooling.

So much for the past. What of the future?

It is bright, of course. Given the proper principles by the sanitarians the mechanical points will be solved without great delay; given proper standards in law and public sentiment mechanical ventilation will be better done; and when better done it will be more universally employed.

The following principles are now pretty generally accepted by sanitarians:

1. Air which moves with force enough to be felt is as necessary for health as it is for comfort, both in warm and cold weather.

2. Air which is higher in temperature than 70° is always harmful except when it is kept in active motion.

3. Air which is above 70 relative humidity is uncomfortable when either hot or cold. When above 85 and the temperature is high it causes the occu-

pants to have fever and later heat prostration. Air which is lower than 50 in humidity is both uncomfortable and unhealthy.

4. Dusty air is to be avoided. The dust in air is harmful chiefly by reason of the bacteria found therein. Inorganic dusts are more harmful; organic dusts less so.

5. When reasonable efforts are made to prevent admixture of foul and fresh air the amount of air per person per hour can be lower than 1,000 cubic feet with comfort and safety even when the occupants are engaged in manual labor.

6. Carbonic acid gas is quite harmless in any quantity ordinarily liable to be found in air. The amount in a room is to be considered as a measure of the pollution of air in the room rather than as a source of pollution.

7. The foulest air in a room is in those sections toward which the currents of a room are flowing but within a few minutes after the air becomes quiet its composition is uniform in all parts of the room.

8. That there are substances in air which do harm, possibly through an anaphylaxis, certainly through some generalized intoxication; but these substances have not been discovered any more than the poisonous substances in other excretions have been.

9. That within certain limits sunlight, air and space are compensatory. We are sometimes justified in lowering the standards of one provided simultaneously we elevate the standards of the others.

WHY VENTILATION FAILS

Winter is the season when interest centers in the bad air diseases in every part of this country where there are marked seasonal changes in temperature. More than half the people are intermittently suffering from colds. At least one out of ten has a cough; many are sick from pneumonia and large numbers are contracting consumption.

About one-third of Chicago's deaths are due to bad air diseases—almost 10,000 a year—and whether they come from Omaha, Fort Wayne or rural Iowa the figures tell the same story.

These deaths in one way and another are brought about by foulness of the air. At that, the story told by the deaths from bad-air diseases leaves a large part uncovered. There must be added the figures of inefficiency and secondary costs as well as the indirect contribution from bad air to the disabling forces of other harmful conditions.

It has been said that the drinking of bad water does three times as much harm in indirect ways as it does directly in causing typhoid. It would be no exaggeration to say that bad air does five times as much harm indirectly as it does in bringing about deaths from pneumonia and consumption.

The air problem is a big one—big in the harm which it does and big in the measures which are demanded that it may be met.

There is need for pure outside air. This is being met by anti-smoke campaigns of many different sorts.

But outside air is about uniformly bad at all seasons of the year. Therefore so much of the rate from bad air diseases as is represented by fluctuation

between seasons must be the result of circumstances which fluctuate. This brings us to ventilation, for inside air is good in summer and bad in winter.

So many places are poorly ventilated that a man can count himself lucky if he goes a week without getting into some uncomfortable and unhealthy air. The ordinary man at the very best will get into some such place for a part of each day. The farmer who reads this statement no doubt thinks it true enough of the city man but not of himself. On a below-zero morning the ventilation is just a little worse in the farmhouses of Iroquois County, Illinois, than in the tenements of Chicago for the former are snugger and warmer. Certainly, the ventilation of the average working place in Wisconsin is worse than in Chicago, for the air campaign is working better here than there.

I am sure that conditions are better than they have been and the promise is for a steadily progressive improvement. The Chicago deaths from bad air diseases were 750 fewer in 1911 than in 1907 in spite of a gain of a quarter million in the city's population.

If good ventilation could become universal the bad-air disease deaths would be cut to less than half of what they now are—say a saving in Chicago of 5,000 a year, a greater saving than has been accomplished by the campaigns against yellow fever, malaria, plague, smallpox and typhoid fever combined.

From hotels, stores, offices, factories, schools, churches, and homes, from one end of the line to the other the same story is coming back—a mechanical fulfillment of requirements with usually a gain in comfort, though there are many exceptions and usually a loss in health and efficiency—mechanical figures which show results but balanced by an almost universal public opinion, founded on experiences, that the results are not good. This public opinion is confirmed by chemical and statistical data.

Plainly, those theories about ventilation which work out when they are being tested do not in practice bring about healthy conditions. The fact is that the ventilating engineer has not made good. To say this baldly will not accomplish as much as will analyzing the reasons for the condition and putting on each party concerned his share of the blame.

Conditions must be quickly righted, for the public and legal demand must be met. The hope for speedy righting lies in careful analysis rather than in unthinking condemnation.

The combination which passes on ventilation is about as follows: the people, demanding that houses be heated and ventilated; the sanitarians, laying down certain health requirements and setting certain ventilation standards; the heating and ventilating engineers under the control of architects, sometimes in accord and sometimes in rank discord, trying to meet those demands.

The first trouble came from the people. They knew almost nothing about ventilation but they had pretty definite ideas about heat. The profession to which they appealed was known as "heating and ventilating engineers" and, quite naturally, thought was concentrated on heating to the neglect of ventilation.

There is no more exact science in practical operation than that of heating. A heating engineer can tell to the third decimal point about evapora-

tion, radiation, conduction and convection and can install a plant and obtain the results on which he has figured.

Radiation is placed in a room to keep it warm, not to heat the radiator, not even to heat the corner in which the radiator is located; therefore, one would conclude that methods of dissemination of heat would have been one of the earlier research studies of heating engineers.

When we learn that they have not comprehensively studied air currents as a means of getting efficiency from radiation we are quite prepared to learn that they have not so studied them in relation to ventilation.

The second part of the responsibility for the poor development of ventilation rests on the architects. Houses should be as artistic as possible; they should be built of proper material and along proper engineering lines; they should have their interior space divided in such a way as to preserve the economies; they should be properly drained. But infinitely of greater importance than any of these is the necessity that they should be properly lighted and ventilated.

Certainly the architect has not given these values to the different points. I am sure every other feature has had the right of way over ventilation.

He has allowed the sewage ducts to crowd the air ducts into such twists and turns that efficiency was impossible. He has sacrificed air to art, to beams, to everything.

In his office there is a well developed art corps and a large retinue of structural engineers but a poor ventilation equipment—of men and materials. And yet buildings are made to live in and good air is much more important to life than those things which the architect has given right of way over it.

Architects must assume a large part of the blame for abandoned or useless ventilation systems and for houses without provisions for ventilation.

The third party of the quartet of responsibles are the sanitarians. The ventilating engineer has been told to put a certain volume of air into a room at a certain temperature and he has done so. As a general proposition he has solved the problems which were put up to him. Then why is it that the places in which he has installed ventilation are not ventilated?

The answer is that the problems put up to the engineer were not proper problems, or were based upon inexact or misleading information. On his mechanical side he has made good. His work fills the specifications as set forth.

The principle of dilution of bad air as a means of ventilation; the plan to hold carbonic acid gas below one part in 1,000 by dilution procedures; the 2,000 to 4,000 feet quantity standard; the high temperature level; the disregard of humidity; the incorrect ideas about drafts; the wrong teaching about variation in temperature; all these are basic points responsibility for the error of which must be laid at the door of the sanitarian.

The ventilating engineer, being in a sense a sanitary engineer and in addition being the capstone of the structure, has been hurt the worst. That is to say, he has suffered because there is not the demand for ventilation that there should be.

VENTILATING OFFICES, SCHOOLS AND STORES

Some time ago a correspondent wrote that a group of men occupied an office in which the air, for purposes of ventilation, came in through a

transom. The air was cold and one of the five objected to the cold air on his head and wanted the transom kept closed. Such a situation is one of great difficulty. On the one hand, here are four men who want fresh air and, on the other, one is harmed by the cold air striking him.

First, as to the claim of the man who wanted the transom closed. Cold air coming in contact with the body takes heat away from it. Especially is this true if it strikes the skin with some force. If the person affected is a good heat maker, with a skin not oversusceptible to cold, no particular harm is done.

People vary, though, so much in these particulars. Some are cold—neurasthenics who can get up a shiver over any sort of draft. Most of their trouble is imaginary and springs from their generally self-centered and selfish makeup. However, there are people who are genuinely harmed by cold air blowing on them in such a way as to abstract heat faster than they can make it. When men are quiet they will get uncomfortable if the air which strikes them at a low velocity is lower than 50° or if that which strikes them with a higher velocity is colder than 60°.

This means that where a room is fairly well filled with men and women the air which enters must be somewhat warmed before it strikes anybody—that is, in any climate north of Memphis.

Transom ventilation will not work unless there are lights enough close to the opening to warm up the air before it gets to anybody.

A few years ago Mr. Mitten of the Street Railway Company of Chicago put an opening in the front of the car roof. Theoretically it was all right for it provided air enough; practically it did not work because the air was too cold. On the same principle deck sashes (the side window lights near the ceiling) usually seen on street and railroad cars are of little service. Usually they do not ventilate at all. When they do the air is so cold that nobody tolerates it.

So in this particular office the man who objected to the transom had much of right on his side. But the other men had more of right on theirs.

Either the air must be warmed before it gets to the occupants of the room, the occupants must move around enough to keep warm by making heat or else they must dress differently.

Some way must be found to satisfy each group, for each is right.

The proper way to ventilate an office is to draw air through the outside walls by means of ducts leading to radiators placed under the windows—cleaning, warming and moistening the air as it comes through. Fans located in the attic should be used to empty the foul, warm air from the rooms through openings at the ceilings on the inside walls. This is efficient as well as cheap to install and cheap to operate.

But offices are as they are and most people who occupy them must do the best they can with a bad situation. If the room is ventilated by present systems what can be done in addition to setting different standards?

1. The windows must be well stripped.
2. Storm sashes must be used.
3. The room must be blown out several times a day, at least one window, and better more, having been arranged so as to make this possible.

4. Fans must be employed to keep the walls and windows warm and the air agitated.

5. The air must be cleaned by air washers or cheesecloth.

6. Steam must discharge from the radiators into the air of the room.

If the rooms are ventilated by windows:

1. Deflectors must be used.

2. The radiators under the windows must go at full head.

3. Fans must be used to keep the floor zone warm.

4. Steam must blow into the room.

5. The air must be cleaned by cheesecloth.

6. The room must be blown out several times during the day.

7. A ventilating fan connected with a window intake and discharging through the radiators is highly desirable.

In all schools and offices the following requirements must be met:

1. The temperature must keep below 70°.

2. The difference between the temperature 1 foot and that 6 feet above the floor must not be greater than 2°.

3. The humidity must be as high as 50.

4. The air must be kept moving.

5. It must feel fresh.

6. It must be clean.

The methods which apply to offices apply equally well to schools and dry goods stores.

REMEDIES FOR POOR VENTILATION

The great majority of us must continue to live and work in places which are poorly ventilated. Is there anything which can be done without much cost or change in method to improve things?

The first thing to do is to find out what the conditions are and then to discover means of remedying those which are most objectionable. The temperature can be taken at several different places in the room; the humidity can be measured likewise in different places. A fair idea of the amount of dirt can be had from noticing sheets of white paper after exposure.

If the air as it is taken into the intakes is dirty the best method of cleaning it is by washers; but when these are too expensive fair results can be had from cheesecloth used as an air filter. The cloth should be fitted into wooden hoops like those used in embroidering and can be changed as required.

When air is heated it must be humidified. This will require from two to 200 gallons of water according to the space ventilated. It is a small room which requires so little as two gallons a day in cold weather. Steam from the radiators, hot water coils in pans of water, large flat pans on radiator coils or on top of hot-air heaters are required.

The temperature of the water must be kept over 120°; there must be square feet of evaporating surfaces instead of inches if the humidifier is to rise above the level of fakedom. Large wet sponges placed in the air currents give results. So do growing plants if they are plentiful enough.

If the floor zone is cold, warm it by throwing warm air into it with a fan. If the incoming air is more than 100° use a fan to mix it with the

cool air of the room. Above all cool it by blowing it against the cold windows and walls.

When the air is heavy and the occupants begin to grow drowsy and listless open the windows and blow out the room.

TEMPERATURE OF INCOMING AIR

Whenever the temperature of a room is over 68° and the space is fully occupied by lightly dressed people the temperature of the incoming air must never be lower than 60° and it is wisdom to heat it several degrees higher—say to 63° or 64°.

Nothing is more common than to see an elaborate ventilating plant with openings so placed as to give the workers an abundance of cool, fresh air, but so plugged that they give no air, hot or cold, good or bad. The men who were chilled by the cold incoming air plug the openings, sometimes with boards as in the Chicago postoffice, but more frequently with wadded newspapers.

I remember one basement corner in which the temperature of the room was over 90°. A man stood there without a shirt, his bare body covered with sweat. The ventilating duct had an opening right over his head but he had plugged it because the air at 60° chilled him.

He was right. It was safe, as well as more comfortable, to take his chances in that basement without air.

When cold air flows into a room it rolls to the floor and the warmer the room the straighter it goes there.

When radiators are having difficulty in keeping the room warm or the foot zone is cold the best way to increase the efficiency of the heating apparatus is to have fans blow the warm air from around the radiators to those parts of the room most in need of heat. Many of the failures of mechanical ventilation arise from the fact that the ducts deliver cold air into a warm room, repeating the very shortcoming which in the first place caused the owner to supplant window ventilation with mechanical devices.

If there are boilers or machines near the ventilated room causing it to heat to more than 75° the temptation is to use cool air to ventilate and to cool. Such a plan is wrong.

A wiser plan is to insulate the boiler rooms so that they do not heat near-by workrooms; or else to give the hot rooms a separate outlet system and to run the inlet ducts along this in such a way as to save heat.

On the other hand, the temperature of the incoming air should not be higher than 80° when it strikes the occupants unless it is blowing with considerable force.

A large part of the complaint against hot-air systems is because they deliver air in the room in cold weather at 118° to 130°—and that is certainly unhealthy. To be at its healthiest air should flow into the room between 65° and 75°.

LIMITATIONS OF GRAVITY VENTILATION

What is gravity ventilation? When ventilation is done without fans, the moving force being differences in the temperatures of inside and out-

side air, the system is called gravity ventilation. The usual illustration is ventilation by means of open windows.

Warm air is lighter in weight than cold air. Whenever the air in a room is at 70° and that outside is at zero strong currents will blow in and out. When there is 70° difference the force is considerable; but when the difference is but a few degrees the ventilation declines until there is but little air movement. When the atmosphere gets warmer than 50°, the room being 70°, open windows do not give much air. If on the other hand the room temperature falls to 50° or below (as in sleeping rooms at night) windows do not take in much air unless the atmosphere is below freezing temperature.

Further limitation is put on gravity ventilation by the force of wind currents. Of course, it is gravity which causes winds; but there is a wide difference between the warming agencies of a room 12′ x 12′ and those of 1,000,000 square miles of ground. A current flowing in through a window at a rate of two miles an hour would be called speedy. A wind of less than six miles an hour is not much wind.

When the wind is blowing more than ten miles an hour into gravity outlets such openings always will act as inlets. When such a wind is blowing into gravity inlets they will carry enough air to chill the room. If the wind blew steadily from one direction it might be possible, with moderate winds, to adapt inlets and outlets to them; but anyone who has watched the steam and smoke of a city knows that the winds eddy and swirl without regularity as to force or direction.

And, finally, the chief limitation of window or gravity ventilation is in the uneven temperatures in different parts of the room, especially at different levels above the floor. If the cold air as it came into a room would mingle freely the difficulties would be lessened—but it does not. It settles near the floor and (as human legs below the knees are easily chilled) complaints are numerous and insistent. The attention of occupants is diverted, they waste time and energy; eventually, they put down the window and gain comfort, even though it is less healthy for them. Window ventilation is not adapted to factories, schools or offices where there are many employees—certainly not when the weather is very cold.

EFFECTS OF WIND ON VENTILATION

Houses are most ventilated and most uncomfortable on windy days. When the wind is blowing thirty miles an hour it is exerting a pressure of 4.5 pounds a square foot. In consequence every crack on the wind side of the building takes in cold air at a high velocity. This air blows out the dirty, foul air and simultaneously it blows out the heat. On a still day the windows and walls warm the air next them but on a windy day the warmth is blown away and cold air takes its place.

It is for this reason that rooms cannot be heated satisfactorily on windy days.

Winds affect ventilation so much that no plan will work that is not adapted for changes in wind force and direction. When the air of a room is 68° and the outside air is 28° the difference in temperature will pull air

into the room with some force but it is inconsiderable as compared with the force of a thirty mile wind.

It is for this reason that open windows on the lee side of the building will act as outlets on a windy day—the outside area is one of low pressure. An ordinary ventilating fan delivers air with sufficient force to overcome wind pressure under ordinary circumstances but even using them outlets will sometimes act as inlets. All in all, on windy days houses take in a great deal of cold air on their wind side and but little on their lee side; and even heating and airing requires careful planning.

VENTILATION BY WINDOWS

The gravity method of ventilation or, in other words, ventilation by ordinary windows, is excellent for sleeping rooms in a northern climate during January, February, and March. It is all right for living rooms where there are but few occupants. For instance, in a 12′ x 12′ room ventilated by windows a woman can sew or read with comfort, since she can change her position to such parts of the room as are comfortable. It is all right for rooms where the occupants can be warmly clad—and the best example is sleeping rooms—but it is not adapted to workrooms where the workers must work without wraps, overshoes and gloves.

Because much of the school work can be done thus clad it is fairly well adapted to that. About 10 per cent of school children gain more from studying in rooms with open windows and the temperature at 55° than they lose from having to wear wraps and heavy foot covering and work with hands encased in mitts.

It is not adapted to offices, ordinary schools, stores, workshops, churches or theaters.

In fact, in the Chicago climate in midwinter gravity ventilation is of limited use.

Since differences in atmospheric temperature, difference in the direction and velocity of the wind (to say nothing of lesser agencies such as sunshine and cloud) make such a difference in results a broad margin must be left when window ventilation is used. This means inefficiency. A room in which, with proper ventilation, there is space enough for forty people cannot be occupied by more than ten people when there is window or gravity ventilation. Every feature spells waste—waste of space, waste of equipment, waste of effort, waste through inefficiency.

And yet, mechanical ventilation of offices, factories, and stores is usually so unsatisfactory that window ventilation is the lesser evil. Certainly in all mechanical systems there is need of periodic flushing by opening the windows.

The cure for this bad situation, leaving aside bedrooms and a few such places, will not be through window ventilation. It will be through more scientific and at the same time more practical mechanical ventilation.

THE PHILOSOPHY OF FANNING

Scientists, trying to find what caused the ill effects of air, have conducted many experiments along many different lines. None is more inter-

esting and conclusive than those of an Englishman, Leonard Hill. Most of Hill's writings have been issued within the last five years, so his conclusions are not out of date.

Hill placed small animals in a sealed box with no port holes, no ventilating ducts—just solid walls of glass. Small electric fans were so placed as to keep the air well churned. No fresh air could come in, no foul air could get out.

You remember the alarming stories in our school physiologies about badly ventilated rooms, where the carbonic acid gas gradually increased until all life was snuffed out—the Black Hole of Calcutta, the ships in storm and all that grewsome lot?

Well, these observations of Hill shot these stories full of holes for he put men in sealed rooms and kept them comfortable and healthy without ventilation by using plenty of fans. He duplicated the box conditions on a large scale, using a room instead of a box and men instead of small animals.

There are other factors to be considered besides air movement but Hill did a valuable piece of work in showing how necessary it was that the air around us be kept on the go.

Now anything that works practically is right theoretically. We sometimes hear that a thing may be right in theory but not in practice—which statement is untrue. If a thing is wrong in practice its theory is wrong and vice versa.

What is the theory that accounts for the wholesome effect of moving air?

The human skin keeps at about 98° Fahrenheit, the air in touch with the skin at about 95°. The air in a room is usually in the eighties and seldom passes 92°. Therefore, fanning blows the hot air away from the skin and puts cooler air in its place. When room temperature gets to 96°, if it ever does, the next the skin air gets to 98° or over. The human body is a furnace.

The statement is about true that the weather is never so hot but that the use of a fan feels pleasantly cool.

In addition, the skin sheds body waste into the air that lies against it. Hence fanning blows away chemically dirty air and replaces it with chemically cleaner air. Therefore, there is philosophy in fanning—all varieties, from electric to palm leaf.

For the same reasons a drafty room is a healthy room—a windy city is a healthy city.

OZONE

Clean, fresh, circulating air is a great purifying agent, one of the best known. Health authorities are agreed on that point. About one-fifth of the air is oxygen and oxygen is powerful in changing the character of the things with which it comes in contact.

Air that is all oxygen is a better oxidizer than air one-fifth oxygen. Again everybody is agreed. Ozone is an especially active form of oxygen, about three times as active as ordinary oxygen. This is an established fact.

Every health authority advocating better ventilation drums these facts into the people. Certain manufacturers of ozone machines twist these known

facts to convince people that ozone machines should be installed in offices to purify the air therein.

The most dangerous of all fallacies are those which are founded on established and recognized facts. A man must be extremely well informed to know at what point in the twist the fact ceases to be a fact.

In consequence, ozone machines are found in many offices. In fact, a few years ago one was installed in the Chicago city hall and it took a fair amount of testing by the health department to prove to the chief of the department in which the machine was that the apparatus was of no value.

About all that was investigated then was whether the machine did any good. The conclusion was that it did not. The money which it cost was wasted.

Recently the ozone machines as ventilating devices have been studied by Professor Jordan of the University of Chicago and independently by the California Board of Health. They came to the same conclusions.

Ozone will kill typhoid, pneumonia, diphtheria, consumption and other germs but it will not kill these germs until the percentage of gas in the air is so strong that it will kill guinea pigs. In fact, in the experiments the guinea pigs died long before the germs did.

They did not try it on men because that would have been murder. But, having found out the strength that kills germs and guinea pigs they cut way below that at a point where germs would not be disturbed and had men breathe air containing those strengths.

Some of the men got drowsy; some went to sleep while at work; some had headaches; some had colds; some got sore throat.

Air containing a moderate amount of ozone is unfit to breathe. It makes the breathers sick long before it kills disease germs or destroys odors.

On the other hand, the odor from the machine hides the odors of the air foulness; and in modern times intelligent people bathe rather than dope with perfume.

LIVING ROOMS

In a house heated by fireplaces it is easy to decide what shall be called living rooms. In a house heated by steam, hot water or hot air people sew, do light housework and read all over the house. Comfort determines where the occupants stay.

In the winter the room must be warm enough to be comfortable for a person doing light physical work and lightly clad. This means a temperature of 65° to 70°.

Living room temperatures are usually too high. Seventy-five degrees is almost an accepted standard. An excellent wet and dry bulb thermometer for determining humidity has 65° to 75° marked as the limits of proper room temperature.

Ninety per cent of the flats in Chicago at 6 o'clock in the evening have a temperature during the winter months that is higher than 80°.

When the outside temperature is below 30° the ventilating air in an ordinary living room should not blow directly on the occupants of the room. It will take heat from their bodies faster than they can make it when sitting

quietly. The first necessity is that the wind be deflected. On some days this is all that is required; on others it must be warmed somewhat.

Radiators should be placed in front of windows. It is advisable to have the bottom of the window below the top of the radiator or else provide a separate opening below the window leading air through the radiator.

Living room humidity should be somewhere around 50°.

Probably the reader never saw a humidity measurer and yet a measure of humidity is just as necessary for comfort as a measure of temperature.

Most of the condemnation of flats by those who think of causes is due to the dryness of the air in them. When air is heated it must be watered or harm comes. If the steam radiator blows steam into the room the humidity will be raised; or there are many types of water cans made to hang against the radiator coils.

Pans of water set on the radiator or elsewhere in the room are of great service.

FOR FRESH AIR DUCT

The Federal system of heating and ventilation, after laying down its Federal heat unit as a standard of computation for the heating of houses, proceeds to cite standards for the more usual of the unusual conditions. Of such are the variations to be made to provide for the heating requirements made necessary by windows already noted.

Another standard of variations has been worked out for climates that are unusually cold or unusually warm. When the wind blows from the north or west at the rate of twenty-five miles an hour the demands on the heating increase 20 per cent. Nothing is added to the needs by an east wind blowing fifteen miles an hour and south winds blowing five miles an hour and less actually help the heating 5 per cent.

In a more general way wind blowing thirty-five miles an hour increases the heat needs 40 per cent, and forty-five miles an hour 60 per cent.

All this information will be of value in making people comfortable. What will be of greater value will be the detailed instruction on those points that have more to do with their health.

For instance, there is this injunction: "No furnace should be installed without a fresh-air duct."

The weight of the system's authority is thrown against recirculation of air. A fresh-air intake is provided. This is equipped with a dust screen.

The air then passes under one baffle and over another and then into ducts leading to the combustion chamber.

The intention is that the duct be eliminated by the screens, baffles and dust collectors so that the air as it reaches the heating chamber, is cleaned and somewhat warmed.

Around the chimney from the furnace is a second, or air, chimney. The heat of the smoke heats the air in this chimney and thus foul air is drawn from the house as the air chimney receives the foul-air ducts which lead from the rooms.

The dust filter screens in the fresh air inlets are accessible, removable and cleanable.

In order to cure the usual dryness of old style furnace heat insistence

is put on humidity standards, and furnaces are equipped with humidifiers.

The standards provide for a relative humidity between 50 and 70.

On the practical side instructions are given as to the amount of water to be evaporated to accomplish these results.

VENTILATION OF THE BEDROOM

Whoever thinks the agitation for bedroom ventilation ends with the winter time is mistaken. When the outside temperature is higher the air rushes in through every crack. When the temperature outside and inside is the same or within twenty degrees of the same the window openings must be large to get results.

To get high grade air, sleeping out and special ventilating arrangements are needed in the summer as well as in the winter. As a further consideration, some of the people who shrink from the cold of outdoor sleeping in winter feel like going out when the spring time comes on.

The toggery for sleeping out differs a little from that for sleeping in. The art of sleeping out differs a little from that of sleeping in.

HOW TO MAKE THE "KLONDYKE BED."

1. Sew a layer of building paper on the springs and over it a strong piece of unbleached muslin or canvas. This not only prevents the cold from coming up underneath but also keeps the paper in place.

2. Place an unbleached muslin cover over the mattress and a pad on top of it; then cover with a white cotton sheet tucking it in at the head and sides.

3. Cover three-fourths of the bed, lengthwise, with a heavy woolen blanket, part of it extending over one side; put another one in like manner on the other side of the bed. Place pillow at the head.

4. Place a double flannelette sheet, five and one-half or six yards in length, over the bed with the closed end at the foot. Turn in the sides of this sheet (allowing enough room to sleep between) and letting the under part of the sheet extend over and around the pillow.

5. Fold over the flaps of the two blankets and tuck them in.

6. Place one or two double blankets over all, tucking in well at the sides and foot of the bed. Fold back the upper part of the flannelette sheet over the blankets.

7. Place a khaki or canvas cover over the entire bed.

The windows should be raised from the bottom and lowered from the top when you are retiring. If there are two raise one and lower the top of another. The one raised should be toward the side from which the wind is blowing. The lowered one should be on the other side of the room. If the room has a window or windows on only one side at times ventilation will have to be assisted by leaving the transom open or by leaving the door open a few inches and providing an open window either on the wind side or on the lee side elsewhere in the house.

The temperature of the occupied sleeping room should not go above 60° Fahrenheit during the winter time. There must be an appreciable air movement through the room. This is necessary in the winter. It is absolutely

necessary in the summer. When the outside temperature is so great that the sleeping room can no longer be kept below 65° it becomes necessary to have "blowing" air in the room—air moving enough to be felt by the occupants.

The water of condensation in the radiators is liable to freeze during cold weather. There are two ways to prevent this. One is to keep a head of steam during the night and to turn the radiators on full enough to keep the water cleared out. The other is to have a vacuum return system and then to shut off the radiators at night. This is the cheaper plan in the long run.

If the radiators are turned off the room gets its heat from the bodies of the occupants and from warm walls, floors, and ceilings. In cold weather deflectors throw the air in a window in such a way that it does not strike the bodies of the occupants with an unpleasant force.

We have given some details as to bedroom methods because we think the main thing is that the bedroom should be a cold room and the main thing in a cold room is to know how to be cool and comfortable.

Put Up Windows.—*B. T. writes: "I occupy rooms near the center of the city. These consist of a bedroom, bathroom, and large sitting room, the cubic contents of which is about 7,500 cubic feet. During the day the rooms are unoccupied and always have plenty of air circulating through them, and, in the winter months, the temperature rarely rises above 68 to 70 degrees. Owing to the noise, it is impossible to accustom myself to sleep with the windows open. The window area, both front and rear, is very large, and, even when the windows are closed, a great deal of air comes through, and I fancy much more than I breathe. Will you kindly inform me whether, provided at the time of retiring the air is thoroughly fresh and new, any serious injury will result from the continued practice of sleeping in quarters of that size with the windows closed, all the rooms being thrown into one? The writer takes a great deal of open-air exercise, but must confess he does not sleep at times quite as well as he would like. Is not the theory of the necessity for absolutely fresh air one which can be carried to an extreme in some cases?"*

Reply.—You must either raise your windows in your present location or move where the noises will not disturb you so much. You must not sleep in rooms without some window opening. Evidently your rooms are in good condition when you go into them at night. The old idea that you can dilute still air enough to make it harmless is pretty generally abandoned now.

The volume of air which you describe in the second paragraph of your letter—to wit: 7,500—would not be particularly harmful during the first three hours of occupation. The authorities who based their calculations on dilution said 3,000 to 4,000 cubic feet of air an hour was required.

You are correct as to the large amount of window leakage, especially during cold weather. Your windows are scarcely loose and leaky enough to supply more than half the deficiency. If you make use of storm sashes you will not get much aid from window leakage.

Fresh air does harm when it abstracts heat faster than the body can make it. Under all other circumstances it does good. Put up your windows if you have to move.

Deflectors for Open Windows.—*P. B. K. asks a definition of deflectors spoken of for open windows. He asks how they are made and used*

REPLY.—The ordinary window ventilators are deflectors. There are many of these on the market. If you wish to make one proceed as follows: Take a piece of glass as long as the window is wide. The glass should be twelve inches wide and one-quarter inch thick. A board of these dimensions can be used instead of glass. Make a frame for this deflector. Set it just inside the sash on the window sill. The frame should be so built that the deflecting glass or board can be set parallel with the window pane—that is, perpendicular—or that it can be moved out at the top for a space of four inches. The deflector then can be set parallel to or at an angle to it. The space on the sill between the window and the deflector should slant out so that rain would drain out of and not into the room.

Suggestion on Ventilation.—*W. B. L. writes: "1. I believe that the best way to heat and ventilate a room is to use indirect radiation, taking cold air from the outside, passing it through a radiator underneath the floor and having the radiator as low and as wide and long as they are made, to give the required amount of radiation; placing a water pan on top and admitting heated air to the room by an opening in the floor in front of the windows; the air to be taken out of the room by openings in the walls at floor level on the outside wall of the room. In this way the heated air would enter the room, rise along the outside wall, traverse the ceiling to the back wall, descend along that, cross the floor to the outside wall, and go out, giving thorough circulation to the air. The natural draft could be used or electric fans; the latter would, of course, give a positive action. 2. Please refer me to several of the best modern works on heating and ventilating."*

REPLY.—1. The ventilating method suggested by you would be moderately well adapted to offices and schoolrooms. To try to carry the air back to the outside wall would be a mistake. Air in the open can only be made to do a few simple things. In the installation suggested by you there should be these modifications:

The air should enter at several places.

A large part of it should enter near the outside wall.

The outlets should be on the outside wall.

The outlet ducts should have openings near the ceiling and also near the floor.

An exhaust fan would be necessary to care for the rooms on the lee side of the building.

To take the air through the walls and let it flow through the radiators would be cheaper, simpler and more effective.

The floors are warm in buildings several stories high. The radiation underneath the floor would fit a one-floor school building.

2. *Heating and Ventilating Magazine,* 1123 Broadway, New York; Carpenter, Hoffman, Raber and Allen.

Special works: Wilson, "Air Conditioning"; the British Parliamentary Reports; MacFie, "Air and Health"; Shaw, "Currents"; Parkes and Kenwood, "Hygiene."

A magazine giving much space to ventilation is *Human Engineering,* Cleveland, O.

Sleeping Room Regulation.—*R. M. B. writes: "Will you please advise the proper method of ventilating a furnace-heated sleeping room occupied by two adults and a six months old baby. As the baby sleeps alone in his*

crib we are anxious to know if it would be injurious to him if the temperature got down to 40°."

REPLY.—Furnace heat delivers air in the room at a temperature of 118° to 130°. When the windows are thrown open the hot air goes straight out without heating very much. Fasten a twelve to eighteen inch board across the bottom of the windows so as to deflect the incoming air upward. Raise your window about one to two feet from the bottom. Leave the top up. In this way you should succeed in keeping the temperature at 50° to 55°. Forty degrees is too cold for the baby.

Regulation Is Necessary.—*J. H. writes: "Will you kindly tell me what kind of heat you think the better for health, hot water or steam? We live in a steam-heated apartment, and my baby has had bronchial trouble all winter. I have been told it was due to the steam heat, and that hot water would be better for him, as it is more regular. Our apartment gets too hot when steam is put on, and if we shut off the radiators we freeze before steam is put on again. It is cold during the night. On the very chilly nights baby took an extra cold each time."*

REPLY.—Practically, there is not much difference between them. Hot water heat is more even, but with steam heat it is easier to humidify. Properly regulated with thermometers and humidifiers and aided by wise use of windows either can be made satisfactory. Without such regulation and aid neither can be made satisfactory.

Ventilate Room.—*B. B. R. writes: "I have been accustomed to an unusual amount of fresh air in my bedroom, but since my baby came, being obliged to have her sleep in the same room, I have had only one window open about three inches. The baby is 5 weeks old and healthy. What is the lowest temperature she could stand?"*

REPLY.—The baby can stand as much cold as the mother. She should be warmly wrapped. Ventilate the room better and the baby will thrive.

Sleeping Out of Doors.—*Miss M. R. is in perfect physical condition. She started sleeping out of doors last summer and wants to know whether she shall keep it up through all sorts of weather including rainy and damp nights.*

REPLY.—Yes, if the sleeping place is properly arranged so that the sleeper is comfortable. Otherwise, no. If the porch is deep enough or screened or if the bed is covered by a rainproof covering dampness of the air or rainy and snowy nights should not deter.

Window-Ventilated Office.—*R. G. works in an office that is ventilated by windows. He says that the warmer the room gets the colder his feet get. Why is this?*

REPLY.—Cold air goes to the floor. The warmer the air in the room the more quickly the cold air gets to the floor. The more quickly it gets there the warmer it is when it gets there. The hotter the air is where the head and shoulders are, say five feet from the floor, the colder will one's feet and legs be in air one foot from the floor. When the room ventilation is through windows and the room temperature is 78° one's feet will feel colder and the air near the floor will be colder than when the temperature of the room is 68°.

How to Make Deflector.—*J. E. L. writes: "In your article today on ventilation you say windows in bedrooms should be supplied with deflectors. Kindly explain how to make and how to put them on properly. Also, is it sufficient ventilation in winter to let in the air by having the lower sash closed on a board, thus allowing fresh air to come in between the two sashes, as is often done?"*

REPLY.—There are many deflectors on the market. To buy one of these is usually more satisfactory than making your own. To make one take a piece of glass or a piece of board twelve inches wide and of a length equal to the width of the window. The thickness should be one-quarter to one-half an inch.

Make a frame for this. The frame fastens at the bottom of the window frame inside the lower sash. The inside of the deflector should be three inches from the wood of the window sash frame. The top of the deflector should have four inches of play. It should be arranged to catch with the perpendicular of the deflector parallel with the window pane and about four inches therefrom. It should also be arranged to catch with the deflector at an angle with the window pane, its top being eight inches therefrom.

Closing the lower sash on a board allowing air to come in between the two sashes is satisfactory in unoccupied rooms. If one or two windows in a room can be so fixed and the number of people in the room is below five it will be satisfactory in cold weather. In warm spring weather or medium weather in spring and fall there is not enough difference between the room temperature and the outside temperature to pull in air in sufficient quantities. The opening is too small.

Sleeping in a Draft.—*Mrs. E. E. writes: "Should one sleep or sit in a draft? My husband claims one cannot get a change of air in a sleeping room without a draft. He and I have had many arguments about sleeping in drafts. I am against it."*

REPLY.—Everyone should sleep in moving air. When air moves strongly enough it is called a draft. If the air is cold its movement is felt when it is going only a few feet a second. When the air is warm its movement is not felt until it gets much faster. No two people call the same thing a draft. A force of air movement which one person objects to is pleasant to another. A force which in the summer is a most pleasant breeze in winter is a horrid draft. A force of wind which one exercising in the open air thinks exhilarating is unpleasant to the same person sitting in a room.

The rule is: Sleep in air which is moving just as much as you can stand without being chilled. Do not stay in any air current which chills you. If you chill easily try to train yourself by exercises, cold baths, massage and exposure to stand more draft without chilling. It is fine for you if you can stand it. It is bad for you if you cannot.

Both of you are right—he in his theory and you in your custom. But you had better change your custom gradually.

How to Ventilate a Room.—*"Salutaris" writes: "Are the effects on health deleterious where there is no way to cause a current of air to pass through a room, no transom or door on the other side? Can you suggest any method for proper ventilation for such a room?"*

REPLY.—I take it that you have a window on one side of the room. If you will raise the lower sash two feet from the bottom and lower the top

sash two feet from the top you will get good results in weather below 40°. When the atmospheric temperature rises much above 40° the house temperature will not move much air.

Ventilation.—*N. B. G. writes: "If the occupants of a furnace-heated building, having inside air supply drawing in part from rooms occupied by a tuberculosis patient 'are in no danger,' it is reasonably assumed that this method of furnace air supply is not unhealthy. Were it unhealthy the occupants would be in danger. How then can the foregoing be reconciled to the definite statement that 'recirculated air is unhealthy' when dealing out advice on furnace installation?"*

Reply.—If you will refer to the letter in question you will see that the writer was asking whether consumption germs would be dried, picked up by the air currents, carried from one part of the house to another and then infect healthy people. The reply was that there was no danger. There is a difference between the carrier action of air and the unhealthfulness. Air is frequently unhealthy when it is not a transporter or carrier of disease germs. There are two tendencies in the country as regards ventilation view. One is a lessening fear of air as a germ carrier; the other, a growing fear of bad air as a producer of unhealthfulness. These tendencies are not contradictory.

Outdoor Sleeping.—*Earnest Inquirer writes: "1. What is your opinion on sleeping out of doors? 2. Do you believe it is good or bad to sleep on a north porch, exposed to the lake in cold weather or damp weather? A member of my family is a crank on the subject and it worries me exceedingly."*

Reply.—1. I believe in it.

2. Depends on the party and on the facilities. Some people are benefited by sleeping on a north porch in Chicago without effective wind shields; others are not unless they have facilities for shielding themselves against winds, storms, light, and noises. The outside sleeping cranks are nearer right than the draft cranks.

Open Windows in Winter.—*S. T. T. writes: "It is time to write something about leaving windows open at night so as to sleep in brisk, fresh, early winter air."*

Reply.—You are right. I begin by publishing your admonition.

Drafts and Colds.—*E. P. N. writes: "Some 'fresh-air fiends' and 'draft cranks' are having a tug of war in a certain club as to whether, during the cold season, the windows are to remain open or be closed. An answer to the following questions would be appreciated: 1. How does impure air cause colds, coughs, et cetera? 2. How do drafts cause colds, coughs, et cetera? 3. When a window is open six inches at the top and bottom is the resulting cold air really a draft? I believe I have heard of some methods of warming the air before it enters the room, but in every room I have been in so far (as in the case of the clubroom in question) it is simply a case of choosing between open windows, fresh air, and a draft (if it be true that in a room without the method mentioned you are bound to cause a draft by opening the window) and closed windows, impure air without a draft. I have never yet opened a window in the winter time when three or four persons were in the room without someone crying out, 'Where is that*

draft coming from?' Then the poor window is discovered open and immediately closed. 4. In case you must have draft in order to get fresh air in the ordinary buildings at present are not the colds, et cetera, caused by drafts in order to get fresh air less severe as well as less frequent than those caused by impure air the result of closed windows? 5. In a room twenty-five feet by fifteen feet, with twelve people in it is the opening of one window six inches from the top and six inches from the bottom too much, too little, or about right? I wish to get an idea of about how quickly the room becomes actually dangerous. Of course, some are so fond of fresh air that they aim to sleep, study, and work in rooms with the air as nearly as possible like that of outdoors. But, on the other hand, there are some who admit the force of the fresh air arguments, but open the window about 1-1,000,000 *of an inch and contend that that much is sufficient to keep the air from being poisonous."*

REPLY.—1. Colds and coughs are due to infections. Impure air (a) transports bacteria, (b) lowers resistance.

2. By chilling one portion of the body drafts lower resistance.

3. In cold weather, yes; in warm weather, no. Every man is his own judge of drafts. A current of air strong enough or cold enough to be objected to is called a draft by the man who objects to it. The speed of the air, its volume, the difference between the temperature of the air of the room and the incoming air—all these are factors, but the determining factor is the man who is passing judgment.

4. (a) If all the air is heated as it enters the room it can be introduced in large quantities without causing complaint of drafts. (b) Yes.

5. Too little in warm weather; too much in cold weather, especially if the window faces the wind. A room 25′ x 15′ inhabited by twelve people cannot be ventilated by windows in cold weather without complaint. The "fresh-air fiends," as described by you, are exceptionally well off. One can get on with less air without being greatly harmed. This is as definite as I can be in the space available.

Kitchen Air.—*J. D. S. of Kewanee writes: "Is it healthy to take air from the kitchen of a dwelling where all the work in cooking and other housework is done and pipe it to the furnace in the basement, and thence to the sleeping and other rooms?"*

REPLY.—Kitchen air is about as healthy as any inside the house. It is too hot and too moist and that makes it bad for cooks but these conditions can be rectified before it reaches the living rooms. Kitchen odors are not unhealthy but the family would object to having them sent all over the house.

For Well-Ventilated Cars.—*W. R. R. writes from Shermerville, Ill.: "I wish to suggest that one car on each suburban train should be a 'fresh-air car' for men and women. It should be sufficiently ventilated to keep the air pure and supplied with no more heat than the other cars. When any of the numerous persons who now object to seeing a few ventilators open happen to get into this car they can be invited to move into the next car instead of interfering with the proper ventilation, as they usually are able to do under present conditions."*

REPLY.—The suggestion is good. It would take the railroads several years to change their cars so they could be properly ventilated. In the

meanwhile they might have one car that was healthy and comfortable for some people and uncomfortable for others and the remainder of their cars unhealthy and comfortable for some and uncomfortable for others. Cars can be ventilated so as to be both healthy and comfortable for the great majority of people.

The present railroad car ventilation is about the limit of pigheadedness. Nearly four years have elapsed since the Master Carbuilders' Association published a report showing the inefficiency and unnecessary cost of present methods and suggesting new methods. One railroad, the Pennsylvania, acted on the report. Up to date it has made no impression on the general run of passengers.

More Ventilation.—*F. C. writes: "For years I have had a weak throat and difficulty in talking at any length. Last winter I lost my voice for six weeks. Have had many colds which always terminated in severe coughs. I have no cold now, but cough at intervals.*

"I do not have long coughing spells, but cough a little at times in order to clear my throat. The entire trouble seems to be in the throat. Is there any danger of tuberculosis?

"I am and have been a stenographer for years. I have no other symptoms, good appetite, and am not losing flesh. I am always extremely tired in the morning and never feel normal until after breakfast. I walk to and from the office, one and one-half miles each way."

Reply.—People who are tired in the morning have usually slept too much or slept in a badly ventilated room. If you sleep in a well ventilated room you ought to have fewer colds. Your letter suggests that you have an area of chronic infection in your nose or some sinus leading from it and that this infection occasionally spreads to your nose and larynx. If this is true your colds will recur until this focus is cleaned up. Your letter does not suggest tuberculosis.

Ventilating a House.—*W. B. writes: "I should like to have you describe a common-sense, practical method of ventilating thoroughly an ordinary two-story, six-room, hot water-heated residence, during the winter months. We have two boys, 5 and 2 years old respectively, who must spend some time indoors during the day in bad weather, and the problem is to give them the best hygienic conditions and still not subject them to the danger of colds through drafts from open windows, etc. If plenty of outside air is admitted is the humidity sufficiently high or would you advise using water pans through the house? Would 60 on the hygrometer be a good point at which to keep the interior humidity and, say, 68° temperature?"*

Reply.—I do not think you will be able to get the humidity of your house up to 60 except in the cold bedrooms.

Throw the windows of the bedrooms wide open. Fasten a blanket across the foot of the bed or use a screen so as to keep the wind from blowing straight on the boys. Keep the temperature at 45° to 55°. The humidity will keep at 60 or over without any help from humidifiers.

Have them dress in the bathroom with the thermometer at 75°. Pay no attention to the humidity in this room.

Keep the temperature of the living room at 68° and the humidity as near 60 as possible. You probably cannot get it higher than 40. Use pans of water and every other aid possible. Four times a day have the

boys play some lively game and while they are doing so throw open the windows and drop the temperature to 60°. The humidity will come up to 50 for a short while.

There are few days bad enough to make it advisable to keep the boys in for all the day. Even babies over three months of age should be out at least two hours practically every day in the year.

Air the House Well.—*G. H. F. writes: "Please advise me what liquid of strong, pleasant odor will counteract the smell of varnish, still not injuring or affecting its properties or ingredients."*

REPLY.—Varnishes are sometimes dissolved in wood alcohol the fumes of which are poisonous. Get rid of the odor by opening the windows and airing the house well.

To Insure Pure Air.—*W. N. K. writes: "Is there any device or appliance which one can wear while traveling to reduce the intake of contaminated air, etc.?"*

REPLY.—I know of no such device nor would one be practicable.

The better way is to build and operate railroad and street cars so as to facilitate the outflow of contaminated air and the ingress of fresh air. Cars are generally badly ventilated. Agitate for ordinances and laws forcing better car ventilation.

Method to Be Avoided.—*H. J. B. writes: "What is your judgment as to installing a hot air furnace with two registers in each room, one to take the air from the room and the other for hot air to return? These jobs are frequently put in without taking cold air from the outside. The claim is made that there is great economy in not taking the air from the outside."*

REPLY.—The practice is one of recirculating the air. It saves money, it is true, but in my opinion at the expense of health. Some recirculation is compatible with health but no research work has determined just how much and certainly in practice no effort is made to adjust the recirculation on the basis of health.

My advice is, until this matter is fully determined, to avoid recirculating hot-air furnaces as one would avoid a man with smallpox.

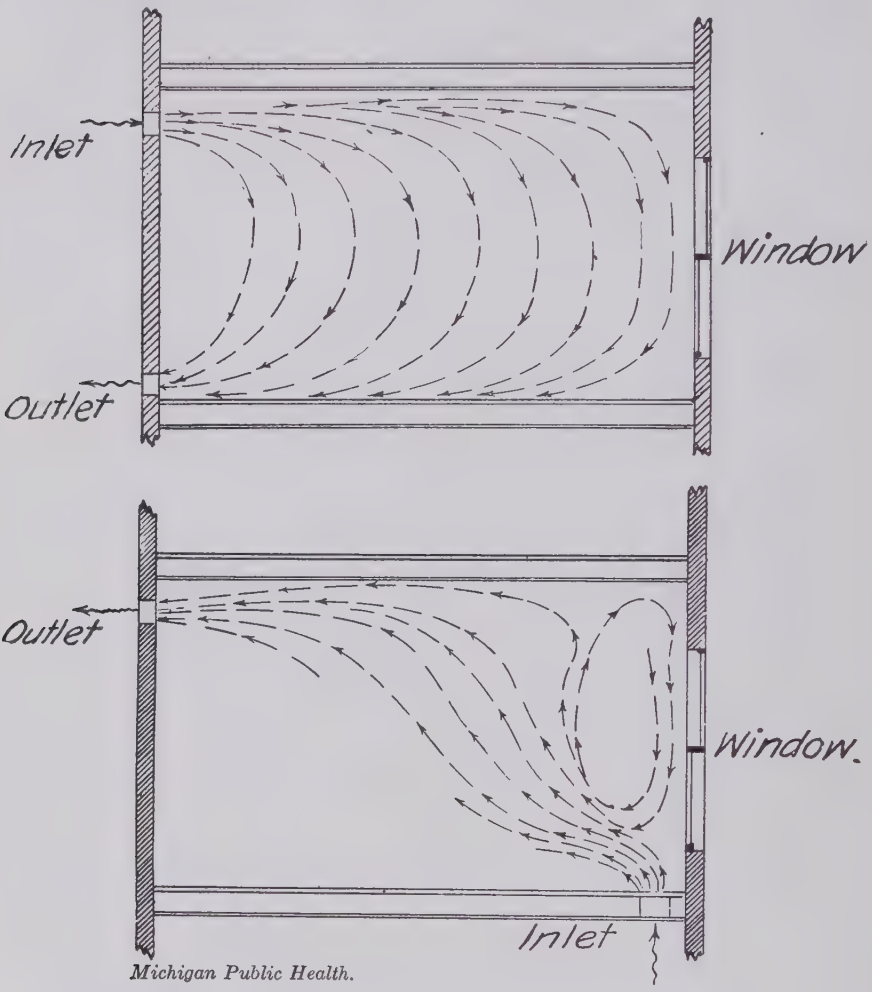
Bad Air in a Basement.—*T. R. says he is employed in the basement of a wholesale house where the air is bad. He asks, "Will a five-mile walk and deep breathing while walking 'overcome' the bad air absorbed in the lungs during the day?"*

REPLY.—A five-mile walk and deep breathing will overcome much of the effects of bad air absorbed during the day, by reason of working in the basement of a wholesale house where the air is bad. At the same time it is doubtful if it will overcome it all. My advice to you is to find employment in a better ventilated place.

Coughing in Theaters.—*J. H. R. writes: "Every time I attend a theatrical performance I am annoyed by persons all through the theater who cough incessantly. I never am troubled this way, and so I write to ascertain the cause of it. Perhaps it is the imperfect ventilation."*

REPLY.—The reasons are several. In the first place the ventilation is poor. Several hundred people crowded together in one room make a lot

of heat. The illumination makes additional heat. The audience gathers quickly and disperses quickly. This adds to the troubles of the management. All in all, theater ventilation is usually a poor job. There is a tendency to cough engendered by hearing others cough. Much more important than the last is the coughing excited by laughter. A farce comedy is a better cough stimulator than a mild melodrama. Until we recog-



Michigan Public Health.

FIG. 486.—INFLUENCE OF CLOSED WINDOWS ON ROOM AIR CURRENT ON A COLD DAY. HOT-AIR HEAT.

nize colds as contagious and preventable a person will be a little better off if he will stay away from the theater from January to May. The coughing prevents him from hearing, so what's the use?

Church Ventilation.—*L. C. F. writes: "Kindly print something in regard to ventilation of churches. Ours is a small church with windows close to the pews on either side and at the back of the choir loft. The windows are always let down from the top on both sides, or on one side and*

back of the choir, thus making everyone in the congregation sit in a draft."

REPLY.—About the only thing you can do is to warm the air before it gets to the people. One way to do this is to put deflectors on the windows so that the air goes to the top of the room and is partly warmed by admixture with the warm air before coming in contact with the people. This method works fairly well on moderately cold days. A better plan is to place deflectors and ducts so that the fresh air is sent through the radiators. This can be fairly well done without electric fans but the service is much more efficient when small electric fans (one-eighth horsepower, for instance) are used. Drafts of themselves are not harmful. The temperature of the air in a draft may be so low that it robs the body of heat a little faster than the body makes it. Under those circumstances, a draft does harm.

HEATING

Those who contemplate reading this series of articles will do well to remember that the ends sought and the methods used must vary with the season, the climate, the business and with special conditions.

In writing them I have had in mind the usual conditions which prevail in Chicago during the cold weather of midwinter. It follows that they will not fit so well when the weather gets warmer nor can they be applied without adaptation when the proposition is to ventilate a house in a climate which is much warmer or more humid than that of Chicago.

In the main the principles involved vary widely according to the atmospheric temperature, the amount of wind and its velocity and the relative air humidity.

I cite some illustrations: In very cold weather the air is too dry; in warm weather it is too wet. In cold weather the house temperatures are 40° to 80° higher than the air temperatures; in warm weather they are 20° less. In cold weather fans are used to create drafts of warm air; in warm weather, of cold air. In Mississippi the woodwork swells in winter and shrinks in summer; in Illinois the reverse is true. Effort is necessary to humidify the air of schoolrooms and flats; on the other hand, laundry, bakery and packing house ventilation requires that the air be dried.

The most important point, however, for the reader to bear in mind is that individual problems require individual treatment. Correspondence ventilation is like correspondence medicine in that it becomes harmful when it is carried beyond its limitations. A given ventilation problem must be carefully studied and the remedy devised to suit the conditions found.

The general principles laid down form the basis upon which to build. They do not constitute the whole of the building.

HEALTHFUL HEATING OF HOUSES

Before winter begins the shop windows have displayed rows of trained batteries in the nature of stoves, ranges and heaters of all kinds announcing the battle royal to be fought with Old Man Winter. Gradually these batteries, Shiny Black, Lustry Bright and Batter Big Chest, are distributed to the

houses of our citizens. Once more mere man asserts his superiority, mounts a step ladder to prove it, gets the stove piped and confers upon himself a sooty mark of distinction while the real master, the lady of the house, watches it all with a directing eye. Outside is heard the heavy trudging of horses pulling a wagon brimful of coal. Last but not least, the janitor is becoming more officious. Everything shows preparedness to fight with heat and fervor the onslaughts of Winter.

There are many methods of heat each having its advantages and disadvantages. The great advantage of heating by open fires is that ventilation is added. The disadvantage is that it heats the room unevenly. The outside walls are always cold and the floors are usually so. The fire must have air, and the incoming air is necessarily cold. Arrangements can be made to deflect it but none can be made to heat it. Open fireplace heating is adapted to rooms occupied by a few people—for example, sitting rooms.

Open fireplaces in which gas is burned are open to another objection. Frequently rather ornate gas logs are used. The gas flows from a small pipe into a larger space and there escapes from many openings. Frequently these openings are more or less obscured by asbestos. In consequence unburned gas nearly always escapes and in a short while the odor in the room is appreciable.

The remedy is easily applied. Gas logs should be simple and plain with a small number of openings and those in such plain view that a point from which gas is escaping into the room could not be overlooked. Occasionally heating is done by a gas burner which has no chimney or flue attached. This is always to be condemned. When gas burns it is not destroyed. It is merely changed into other gases and these are almost as harmful as the original gas.

And finally those who make use of open-fire heating whether they use coal or gas should remember that unless the windows are raised or the ventilators are opened the air of the room speedily gets into a harmful condition. This happens more quickly than where there is steam or hot-water heating and lack of ventilation.

The conclusion is that for rooms occupied by but few people and with ventilators and windows sufficiently used open-fire heating is excellent. In the milder climates, say south of a line through Memphis and in the Southwest, its advantages are great enough to overcome its discomforts. This is true of its use in houses and small halls. It can be adapted to school use in California, the Southwest and in the South beyond Montgomery, Alabama.

HEATING THE HOUSE

Heating by hot water has its advantages and disadvantages. It is an economic method of heating as compared with heating by open fireplaces. In fact, it is easy to demonstrate that the saving is great enough to more than pay for the cost of installation and upkeep in the lifetime of the plant.

It is to its disadvantage that it does not make ventilation a necessity. As we have seen, however, this advantage of the open fireplace is not what it seems, since there is no way of warming the cold air and in the effort

to stop the stream of cold air along the floor, doors and windows will be closed and cracks will be chinked.

As a means of keeping the floor warm, hot-water heating is midway between hot-air heating and open-fire and stove heating.

In hot-water heating the temperature of the coils is never so hot as steam coils get at times. This is something of an advantage though not a great one.

To my mind, the great drawback of hot-water heating is the difficulty of humidifying. To remedy this defect three methods have been employed.

Pans are placed on the radiator. These do not evaporate enough moisture. By the use of wicks, towels and evaporating bricks the amount of evaporation may be materially increased.

Fountains are employed to throw a fine spray of cold water into the air. Steam evaporated in a special vessel in the firepot is discharged at some advantageous point in the room.

The satisfactory humidifier used by Dr. Bryce discharges steam into an air intake.

Heating by steam has the economies of hot-water heat. It allows the placing of the heat under the windows and against the outside windows. Thus wall chill as well as window chill is provided against. The leaking air is promptly warmed. The temperature of the chilled air is raised.

Its advantage over hot-water heating is in the greater ease with which humidifying is done. Steam from the radiators can be used to moisten the air in the room.

Direct-indirect heating: This term is employed to designate heating where fresh air is taken into the room behind the radiator coil and, having been warmed, is discharged into the room. It is, therefore, a method of heating combined with a method of ventilating. As a heating method it has the great advantage that the incoming air distributes the heat throughout the room.

PROBLEMS OF HEATING

An important question to decide is whether it pays to keep a building heated all the time or to let the heat die down when the building is not being used. On this subject there are a multitude of opinions. Many of the men holding opinions have investigated or observed conditions to some extent and base their opinions on what they have observed. That they should hold such contradictory opinions points to the probability that under certain circumstances it pays and in others it does not.

The opinions are determined by the point of view of the holders. The man who has to hustle out of bed on cold mornings to make the fires no doubt would advocate keeping the house heated all the time. Those who stay in bed until the house warms up might think differently about it.

The problem is one of heating both the walls and the air. The air with efficient heating methods is quickly heated, but it must be promptly changed. The walls heat slowly but when once heated if they be well made they remain warm.

The time required to heat a building depends on its exposure, the snugness of its walls and windows, the materials of which the walls are composed,

and some other items. A large building with thick walls may require twenty-four hours to heat up. That the time required can be accurately calculated is shown in two articles in the *Heating and Ventilating Magazine,* one by Tea and the other by Donnelly.

If the fires are to be allowed to die down, for example, in schools on Saturday and Sunday or in churches during the week the heating plant must be built larger than where the fires are to go all the winter. Wolf says this excess should be 10 per cent for a sheltered building heated in the daytime only; 30 per cent if the building is greatly exposed. The increase must be 50 per cent in churches cold for several days on a stretch.

Mr. Mackay, a ventilating engineer, says: "It takes more coal to raise the temperature in a building than it does to maintain it."

Professor Allen says that at the University of Michigan they burn 100 tons of coal a day in a 3,000-horse-power plant. As the result of experiments they found it took about one ton more of coal to maintain heat in the buildings over Sunday than to allow them to go cold and then reheat them. In discussing Professor Allen's paper Mr. Weinshank said that in designing the heating for a building he always added an excess of 30 per cent in radiation if the building was to cool down at night. He thought a church saves coal by keeping its building warm all the week and as proof he cited two churches—one heated on Wednesdays, Saturdays and Sundays and the other heated all the time. The one heated all the time used less coal than the other. Professor Allen's method of comparing was much more accurate than that of his critic. But one point made by Mr. Weinshank must be taken into account. He said: "Any heating apparatus operated intermittently also suffers greatly from wear and tear."

TYPES OF HEATING

Gas Heaters.—A bathroom should be a little warmer than the average. In order to make this possible, small gas heaters are in common use. The same type of heating apparatus is used to a limited extent in bedrooms in cold climates for a short while morning and night in the spring and fall. In the gulf states such heaters are used in bedrooms for an hour or two morning and night during the warmer days of midwinter.

Gas heaters of this type are generally without any chimney or pipe to carry the colorless, odorless smoke to the outside air. Where built in this fashion they are just about as vicious a device as is known in civilized society.

By a rough sort of calculation, when a foot of gas is burned two cubic feet of oxygen, that is ten cubic feet of air, is used up and three cubic feet of carbonic acid gas is made. One can readily see that a gas stove running a few minutes in a closed bathroom makes the air unfit to breathe. As the temperature of the air quickly gets over 80° and as the water in the tub evaporates rapidly and soon brings the humidity of the room to 70 an impossible combination is brought about. Fat men, men with bad hearts, men disposed to faint, presently become dizzy. Unless the window is raised or something else is done the man faints. If he faints and falls in the water he drowns.

When this type of heater is used in a bedroom the conditions are not so bad. The room is larger, the walls are less snug, the humidity and the

heat are less. Such use kills nobody outright and used for a few minutes to moderate the temperature does no material harm.

In many cities the ordinances require that such heaters shall have a stovepipe leading to the outside air. Such pipes carry off much of the carbonic acid gas and prevent some of the overheating. Let us say they cut the danger in half.

For use as bedroom heaters a gas stove is made with some water carried in pipes in the back or baffle plate above the flame. The statement of the selling agent is that this water moistens the air in the room. As a gas heater rapidly adds heat to the air and does not add moisture the air in the room speedily becomes very dry. Whenever heat is added to air a proportionate amount of water must be added or the air becomes unfit.

The need is present but the remedy offered by the selling agent is no remedy at all. By what magic water in closed pipes can become water in air deponent sayeth not. As the water in the pipes cannot be heated much above 212° and the carbon flame is much above that figure the net result of the use of this type of apparatus is the precipitation of solid particles from the unburned gas as soot, some of which goes to soil the walls and curtains and some to soil the lungs.

If the manufacturer will provide an escape valve so that the steam from the coils will escape into the air of the room there will be some gain from the coils—enough to offset the harm from the increase in soot.

Gas heaters without stovepipes in bathrooms should be made unlawful everywhere. Gas heaters with or without pipes are allowable in bedrooms where they are in use for not to exceed fifteen minutes on condition that the room be aired soon afterwards.

The height of folly is represented by the gas logs with asbestos whiskers. I suppose this monstrosity was devised by some poetic soul who thought it pretty. They are sold to esthetic souls who think they are esthetic. To my mind they are gas exuding, dust catching monstrosities and punishment for installing one should be hanging.

Gas flows from a small pipe into the wider logs, thence it issues by a hundred holes. Through some it goes with force and volume and burns readily; through others it oozes too feebly to flame. As the openings are covered with asbestos the only available proof of the air pollution is the odor. If the asbestos were absent the leaking pores could be detected and the flame be turned higher or off entirely. On the other hand, gas logs without asbestos whiskers would fall into disuse at once. Nobody who knows that customarily a quarter of the holes "do not burn" installs them or uses them.

Open Fireplaces.—*Heating by open fireplaces is inefficient and most uneconomical. It is advocated because it carries with it automatically ventilation that is fool proof. The ventilation afforded by open fireplace heating is not good ventilation—in fact, it is bad ventilation but bad as it is no fool can make it horrid. If the windows are leaded in, the doors chinked, the walls made impermeable and no ventilation ducts are open the fire will not burn. In that sense, the ventilation attendant on fireplace heating is fool proof. The same cannot be said of the prevailing school, church, factory and office ventilation.*

The old fireplace burning great wooden logs did well enough when fuel

cumbered the earth and the more you burned inside the house the less you had to burn when you cleared the new ground. The coal grate is not so wasteful but it is wasteful enough. Much of the heat goes up the chimney. The fireplace is located on the inner wall and that part of the room is nearly warm enough without a fire. On a cold day a good hot grate fire may warm a room for a distance of about ten feet. The balance of the room will be too cold for comfort. Persons in the outer two-thirds of this zone will be warm on one side but the rest of their bodies will be chilled beyond all comfort by the cold air flowing from the outside toward the fire. Especially will the occupants suffer from cold feet.

Obviously, fireplace heating is not adapted to schools, offices, factories, stores or other rooms where the floor space is fully occupied. The heating is not good enough. As the fresh air pours in in cold streams and flows in such streams along the floor, not getting comfortably warm until it gets ready to leave the room by the chimney, it cannot be said such ventilation is or can be satisfactory. The best that can be said is that ventilation such as it is cannot be wholly done away with.

Stoves.—Stoves have some advantages and some disadvantages as compared with open-fire heating. They are less cheery; and I suppose that everybody will agree that something is lost there. A bright, glowing fire has stimulated many a bright fancy and cheered many a drooping spirit.

Stoves do not stimulate room ventilation as much as open fires do. On the other hand, they have certain advantages. Being placed, as they usually are, toward the center of the room they heat much more efficiently than do open fires. They are much less wasteful of heat, particularly when the stovepipe is used to heat other rooms or other portions of the same room.

They do not heat the outside walls and the floors as well as do proper steam and hot water heating apparatus but they heat them better than open fireplaces do. As the fire in a stove is located inside the room they make for ventilation more than does hot water, hot air and steam heating. If the air is let in the room the fires burn better and thus in an indirect way, stove heating if properly managed helps ventilation.

If, however, the cold air is unpleasant to somebody and the air intakes are closed stove-heated rooms speedily become nuisances beyond compare.

There is another objection to stove heating which is of consequence enough to require some emphasis. It has been found that when iron gets red hot the combustion gas is in part changed from the slightly harmful carbonic acid to the very harmful carbon monoxid. This is partly the cause of the burnt odor of some bad air.

Therefore when stove heating is employed the stove should not be allowed to get red hot unless the windows are opened wide enough to permit the poisonous gas to escape easily to the outside. Who of us has forgotten the red-hot stove, the burnt odor, the feeling of drowsiness, the soon-coming headache?

For rooms occupied by a moderate number of persons stoves are fairly well adapted, even as far north as Minnesota. The one-room school probably will have to stick to stoves.

Can they be installed so as to make them more satisfactory than they now are? Yes.

As at present run they cannot heat the outside walls, they cannot heat the incoming air and they overheat the near-by air. This is more of a load than they can carry.

The remedy is to conduct at least one-half of the ventilation air through ducts under the floor and to discharge it into the room under and around the stove; to take in some fresh air through the windows; to let out the foul air at the windows; to use the windows on the wind side of the building for an accessory air intake and the windows on the lee side of the room for air outlets. Thus will the disadvantage of stove heating be overcome. The stove will not overheat. The temperature of the air next the walls will be increased, wall chill will be lessened, the air for ventilation will be warmer and more tolerable.

If the air is freshened by opening the windows periodically small schools, small halls, railroad stations, farmhouses and small homes in towns and cities can be ventilated by stoves without discomfort and harm as far north as Canada.

Stove heating is much more economical than open fireplace heating. It takes less coal and is more easily cared for. The first cost is small. The fire using less coal than the open fireplace likewise uses less oxygen out of the air.

Having the fire in the center of the room is an advantage as compared with a fireplace on an inside wall. A pan on the top of the stove will evaporate a good deal of moisture. It is somewhat easy to carry the stove-pipes through upstairs rooms and in this way to get a good part of the heat out of the smoke before it is discharged to the outside air.

The disadvantages of stove heating are several. It heats the outside walls poorly. In consequence the air in the room is liable to be too hot and the walls too cool. The desk space next the walls is liable to be too cold; that close to the stove too hot. The iron stove wall gets red hot at times. It is well established that dusty air coming in contact with red-hot iron becomes scorched. The dust particles are charred. Some ammonia is formed and some excess of a poisonous gas called carbon monoxid is formed.

Some of the effects of ordinary stove heating are overcome in certain systems by jacketing the stove and providing evaporation pans. The jacketing lessens the overheating of the space near the stove and circulates the air around the room.

Stove heating does fairly well for country schools and other places where the requirements are full occupation of the floor space and slight cost of installation. If fresh air can be brought into the room into the jacket and warmed somewhat before it is distributed it stands to reason that more of it will be allowed to enter than if it comes in at zero or thereabouts. In such schools there should be hourly registration of the temperature and humidity.

Hot-Water and Steam Heating.—The great advantages of these types of heating are efficiency and economy; and yet there are disadvantages. It is possible to heat well with these methods and have no ventilation at all.

Our ideas of heating and ventilation have been inherited from the old days of fireplace heating. In those days the heating of a room by an open

fire started currents of incoming air which, without planning for it, gave a moderate amount of ventilation. The more loosely the house was constructed the better the involuntary ventilation. We are prone to carry over our ideas of heating and ventilation into our modern quarters.

Heating with steam and hot water can be done without any ventilation, and the more ventilating done the more expensive heating becomes. In fact, speaking broadly, in our modern, closely built houses heating is needed to heat the air for ventilation, the outside walls and the windows. The occupants make more than enough heat to heat themselves, the inside walls, floors, and ceilings. Therefore the temptation always is to reduce the size and number of windows, to cut down the outside wall space and especially to limit the air taken in.

Until better ventilation practices prevail these should be held as legitimate arguments against steam and hot-water heating. This is doubly true since heating engineers and manufacturers of heating apparatus have so signally failed to do their duty toward the ventilating side—for in trade and professional parlance "heating and ventilating" are coupled.

Another disadvantage of heating by these methods is that the air is too dry. This can be remedied by allowing steam to escape from the radiators into the dry air. It can be accomplished less well with steam or with hot water by using the radiators as evaporators.

A great advantage of these methods is that they allow the heat to be radiated at those places in the rooms where it is needed, that is, near the windows and otherwise along the cold walls.

Another point which with a little planning could always be taken advantage of is that the ventilation air could be introduced into the room as moderately warmed air. This is especially necessary if the room is to be occupied to its full capacity.

The advantage claimed for hot-water heating is that the air is more moist than in steam or stove heating. In hot-water heating the air comes in contact with coils that are 170° Fahrenheit and below. Fluegge demonstrated that when dust was heated to more than 160° it became offensive. It was singed and distilled and there resulted some ammonia, some carbon monoxid and some other substances less harmful but more offensive. This cooked odor and feel some people try to avoid by keeping the heating apparatus free from dust, while others adopt the less troublesome procedure of putting in hot-water heating.

A great advantage of hot-water heating is that the air leaves the heating surface at a fairly low temperature. The authorities are generally agreed the air should not be brought into a room at a temperature higher than 160°, *and some of the best of them say the temperature should not be higher than* 104°. *Hot-water heating meets this requirement well indeed.*

We commonly hear it said the air in hot-water heating is less dry than with other methods of heating. A part of this opinion is purely psychological; a part of it is based on material differences. If the air contains a certain quantity of moisture, enough to give a relative humidity of 70, the relative humidity can be dropped by raising the temperature of the air. The amount of water in the air remaining the same, the air would be comfortably moist when it was cold and uncomfortably dry when it was hot.

Another advantage of hot-water heating is that the heat coils can be placed under the windows and around the outside walls—locations where heat does the most good.

So much for the advantages of hot-water heating. Now for its disadvantages.

One, and the most important one, is that it is not a ventilation procedure. Hot-water heating can be well done without ventilation. Most people do not know that heating and ventilation are two procedures which are frequently combined but which, nevertheless, are two procedures. The average man thinks that when one is attended to the other is also.

A system of heating that does not necessitate ventilation sometimes leads to bad conditions. When a room is heated to 70° and the outside air is at zero there will be some ventilation regardless of what is done to prevent. In spite of thick walls, air space and heavy wallpaper, air will filter through. The saying is "Walls breathe." In spite of well-made windows the cracks leak. But this is not sufficient ventilation to keep the air right. When the heat is by hot water the ventilation cannot be made fool proof.

Another objection is the difficulty in evaporating enough water to keep the humidity at 50 in hot-water-heated rooms. In hot-air heating the evaporating pan can be set over the firebox; in steam heating steam can be discharged into the room from the steam coils. But I know of no way to evaporate enough water in hot-water coils to hold the humidity at or above 50.

Those who advocate steam heat claim that it is highly efficient; that it saves coal and thus saves money; that it heats all parts of the room so well that desks can be put next the windows as well as elsewhere and that thus it saves money; that it heats thoroughly, heating the walls as well as the air; that the heating is so thoroughly done that the people are willing to ventilate, which means that more people can be put in a room and that thus also money is saved.

These claims are quite true; and yet some of the worst ventilation of which I know is in steam-heated places, as with hot-water and hot-air heating the heating can be pretty well done without any ventilation at all.

It is true that when a room is hot and the outside air is cold lots of air will leak in and out even when every window is shut. It is also true, as the Furnace League men say, that it is easier to heat where there is some ventilation than where the air is altogether befouled.

Nevertheless, none of these considerations gives ventilation that measures up to the standards of human needs. It has always seemed to me that the steam-heating men were foolish to have done no work on ventilation since poor ventilation so frequently is found in steam-heated places and causes so many people to "get down on" steam heat.

The hot-water heaters say that the air next the coils in steam heating gets too hot and smells cooked. The hot-air men say that the air in the lower two feet of a steam-heated, window-ventilated room is too cold; that six feet from the floor the temperature will be 78° and six inches from the floor it will be 68°.

Both these statements are founded on existing conditions. Yet how easy it would be for the steam-heater men to provide that air be sent

between the coils of the radiators, thus lowering the temperature round about to a proper level and raising that of the air flowing out over the floors and in this way to overcome these objections!

Again, how easy it would be for the steam-heater men to provide for noiseless discharge of steam into the air and thus stop that other group that complains that steam-heated apartments are too dry.

Hot-Air Heating.—*The advantage of hot-air heating is that it warms the floors better than any other method. It is an effective method of heating. Furnace-heated houses are usually well heated. In many furnace-heated houses there are several objectionable features: First, the air is very dusty; second, the air is very dry; third, the air is recirculated; fourth, the air enters the rooms at too high a temperature; fifth, the air as it came through the furnace was in contact with iron that was too hot and in consequence it smells and feels scorched.*

These are the objections commonly urged against furnace heat. I have insisted upon them more than once. They are valid as against the usual job of furnace heating, yet I have before me a booklet on furnace heating which shows that they are not necessary evils and that no one need put up with them unless he wants to. The furnace men have found a way to correct them. This book convinces me all that is needed for good ventilation is for the sanitary engineers to say what should be done and for the public to demand that it be done. The heating and ventilating engineers will find a way to do it. The name of the book is the "Federal System of Heating and Ventilation." It is a trade publication written by Dr. W. F. Colbert.

The leading furnace manufacturers of the United States compose the membership of the Federal Furnace League, which has been organized and will be maintained not for the purpose of attempting to regulate the selling prices of furnaces but to work logically and persistently for the accomplishment of five objects among which are standardization of methods and the education of the public in heating and ventilation. They begin by establishing a heating standard which they term the Federal Heat Unit.

The writer favors hot-air heating over other methods, as he says, whenever occasion offers; but the information given will be of great value even though the reader does not wholly subscribe to some of the conclusions.

From it we learn that a house of a certain cubic capacity should have a furnace installed of a certain Federal Heat Units capacity with ducts of a certain size; that in calculating the chilling effect of wall space 20 per cent should be added for glass exposure facing north and west, that nothing be added for east glass exposure and that 20 per cent be subtracted for south glass exposure. In addition to the total wall exposure is added one-sixth of the square feet of glass. For example, if a north wall was 10′ x 20′ and had two windows 5′ x 3′ the wall space for heating purposes would be figured as follows: 170 feet of wall space plus one-sixth of window space equals 175 feet; window area, 30 feet plus 20 per cent equals 36 feet. This added to the total wall space equals 216 feet.

Hot-air heating and ventilation is a form of indirect heating. It is nicely adapted to the heating and ventilation of homes and when certain changes are made it will meet the partial approval of sanitarians. Ordinarily

the woman whose house is heated by hot air compares her comfort with the great discomfort of the stove heating which it displaced and it will take a good deal to get the contrast out of her mind. About as much as she will admit is that the air is too dry and that the apparatus does not work well on windy days. Occasionally she complains that the children are paler and have had more headaches and colds than they did in the old, uncomfortable days.

Hot-air heating has the great advantage of heating certain rooms well, of holding down wind leakage and of keeping the foot zone warm. The manufacturers have given much thought to their heating and little to their ventilating. Their furnaces heat fairly well but ventilate so poorly that they scarcely deserve to be called heating and ventilating methods.

The objections to this method are:

1. In many instances the foul air from the rooms is carried back to the furnace, heated and sent back into the rooms—recirculating it is called.
2. The air at the inlets is too hot—from 100° to 130° according to the atmospheric temperature.
3. It is too dry.
4. The gravity force is not strong enough to work in the teeth of a wind.
5. The heated air flows most readily in the vertical pipes and least readily in the horizontal pipes; therefore certain rooms are well heated and others poorly.

Some of these defects can be remedied. For instance, the reason for recirculating the air is to save heat. A more sanitary method would be to run the intake tubes within the outlet tubes, saving its heat but allowing its foulness to escape.

The humidity can be raised by placing pans on top of the furnace large enough to evaporate five to ten gallons of water a day. It is not feasible to keep the windows continuously open where heating is with hot air. For this reason periodic blowing out of the rooms is absolutely necessary.

It is to be hoped that the manufacturers will study their subject so that they can ventilate as well as heat in a manner which sanitarians can approve of.

Direct-Indirect Heating and Ventilation.—When radiators or other heating devices are placed in a room the heating is said to be direct. When the radiators are placed in air ducts and the hot air is blown into a room the heating is said to be indirect. When radiators are placed in a room and air is drawn into the room through the radiators the heating is said to be direct-indirect.

Direct-indirect ventilating requires fewer ducts and fewer fans and therefore costs less to install than do the more elaborate mechanical systems. They are likewise more cheaply and easily maintained. There is not the interference with floor joists and beams and sewer pipes that makes the usual mechanical systems so difficult to install. As the effort is to keep the fresh and foul air as much apart as possible the quantity of air per occupant per hour can be reduced to one-half what is required in other methods of ventilation.

The cost of ventilation, in the main, is due to the heating of the air and

any suggestion which promises to lower the quantity to be heated and which gives results will be in great demand.

There are a few places where the direct-indirect method has been employed; but without much success. Why have these installations failed? They have placed the air outlets near the floor. The direct-indirect method depends on difference in temperature to move the air. This is force enough on a wind free day provided the warm air is allowed to leave the room at the ceiling. It is not enough if the warm air from the ceiling must come back to the floor to get out. The system will work if the foul air is taken out at the ceiling and fan power enough is used to overcome wind obstacles.

It is difficult to make air do complicated things after it has found its way into the free space of a room. The systems which depend upon the air in a room taking certain directions do not work in practice. An advantage of the direct-indirect system is that the air moves from inlet to outlet along simple lines.

Central Plant Heating.—*Heating from a central plant is economical. In this particular, heating by isolated units, such as stoves and fireplaces, cannot compare with heating from a central plant. It is also very much more comfortable heating than that by isolated units. As the object of heating is comfort it follows that central plant heating represents efficiency.*

The question always is, How large should the house be to make the greater economy of the central plant more than offset the cost of installing it and the provision for maintaining it?

There are, though, some advantages outside the first cost. Fire in an open fireplace or a stove will not burn well unless there is air. Where heating is done by steam or hot water or hot-air radiation the heating may be perfect and the ventilation unspeakable. The fire in the basement may be getting a splendid supply of air while the people upstairs are suffocating. If the stove and the people are in the same room they have to take pot luck together.

There are three kinds of central heating—hot air, hot water and steam. Hot air, as compared with steam and hot water, has some advantages and some disadvantages. It has provision for circulating the heat throughout the room and that is a great advantage.

It has two marked disadvantages. They are remediable and no man should tolerate hot-air heating unless they have been remedied. The air is frequently recirculated. That is to say, no provision is made for taking in fresh air. Some leaks in and some old air leaks out but the quantities are inadequate and in the main the bad air goes back to the people and round and round in a vicious circle.

The other is that the air is heated but not moistened. It is low in humidity.

Lesser disadvantages are these: The heat is put in on the inside wall and in consequence the inside wall is too hot and the outside wall is too cold. The air as it comes into the room on cold days is too hot to be fit to breathe. The system does not lend itself readily to periodic blowing out of the rooms by throwing open the windows.

Most of these disadvantages can be overcome. A hot-air heating plant

that has corrected them represents a good type of heating and permits of good ventilation.

Rather than put up with the harm of these things it is better to tolerate the discomforts of stove and open fireplace heating.

USING HEAT

The temperature of a room not equipped with fans must not be allowed to go over 70°. When the machinery makes it impossible to maintain a temperature below 72° conditions can be made fairly harmless by using fans enough to keep the air in active motion.

A bedroom must not be allowed to go over 60° and 55° would be a better maximum. An infant's sleeping room should be kept at 65° until the child is three months old. The bedroom of an infant three to twelve months old should be 55°; after a year 45° to 50°.

Adults should dress in a room 70° to 75°.

A living or sitting room should be 65° to 70°, according to the humidity. If the humidity is under 30 a temperature of 70° is required; if the humidity is 50 to 70 a temperature of 65° is proper.

The same conditions apply to offices and schools. I have nothing to say about factories because factory heating and ventilation are another subject.

Street cars should not be heated above 60° and a 55° temperature is better; day coaches not above 65°; sleeping cars not above 68°.

It will be noticed that the temperatures advised range from 45° to 75°. There is a reason in each instance.

The influence of humidity, of physical activity and weight of clothing must each be considered. Individuality cannot be forgotten. Some have coddled themselves until they have greatly reduced their heat making powers.

Anyone reading this section so far would be justified in concluding that a given type of room should be kept uniformly at the temperature set for it. Uniformity of temperature is harmful.

One of the few advantages of open fireplace and stove heating is the lack of uniformity. Men and women who work in offices where the temperature is evenly maintained slow up and presently get sleepy. About once in so often they get headaches.

The human body needs the stimulus which comes from having changes in temperature. This is one of the great advantages from having the room judiciously blown out from time to time. This, not overdone, will make everybody feel better and the work will show the effect.

GET THE THERMOMETER HABIT

In any town there are thermometers displayed here and there in front of stores. The people would be wise if they noted the temperature from time to time. But the thermometer habit which would be most useful would be the indoor thermometer habit. Ten years ago we had a genus called the draft crank. The collapse of this industry must have left a lot of people who are interested in their surroundings, acute-minded people who want to do the right thing and who need something to specialize in,

without a hobby. What better than to get the thermometer habit? Why should they not insist on knowing the temperature of the rooms into which they go?

It has been proved that high temperatures, over 68°, are harmful. As the temperature rises above that the air around the body cannot clean itself. This being so, should not every house have one or more thermometers and should we not get in the habit of noting the temperature several times a day? Should not every schoolroom have a thermometer? Could a teacher do better by the students than by teaching them to read the thermometer and then having an hourly temperature record made by some pupil?

Our employers have put in registering time clocks. Every employee punches the clock as he goes to work and as he leaves. But there is a difference between sitting at a bench and working. Good ventilation is the speed boss. Cool air is the essence of good ventilation. Employers would make more money if they would spend less on time clocks and more on thermometers. They, too need to get the thermometer habit.

Thermometers Inaccurate.—*P. C. S. writes: "I have been making a few experiments to ascertain the humidity in my living rooms. I have two thermometers that read alike in the same room. On one of them I have put a silk wick. The bulb shows through the mesh of the wick. The wick is about four inches long below the bulb. I have hung this thermometer so that it comes about one inch from water, the wick being in the water, which goes up the wick and moistens the bulb of the thermometer. This thermometer in the room with the dry thermometer at 70° will register from 61° to 63° and will maintain nearly this distance from the dry one, if this one rises or falls six or eight degrees. I wish to inquire what degree of humidity I have in my rooms with this reading. Is it enough for good health at this time of the year? I have hot-water heat. As I took these two thermometers out of doors on a very damp day, the wet one registered 35° above zero and the dry one 34°. Have you any tables that I can tell just what humidity I have with a given reading of these wet and dry thermometers? If so, will you please send me some?"*

. . . . . .

"Since writing the above I have been evaporating about one quart of water per hour, or fifteen quarts in fourteen hours, by means of pans in my radiators with blotting papers in them. Can put four in each radiator. I have twelve in two rooms. I now find my thermometers are registering 64° wet and 68° dry, or within four degrees of one another. This would show too much moisture. Is there any danger with so much moisture—that is, are we more liable to catch cold in this damp atmosphere, or what will be the effect? I can and have reduced the number of tanks in radiators, for I was not running the furnace hard when I got the above evaporation. The rooms are 30 x 18 and 14 x 15 feet, two of them with large halls connected with them, with open stairway."

Reply.—A dry bulb reading 70° and a wet bulb 62° means 64° relative humidity. A dry bulb reading 35° and wet 34° means 99° relative humidity; 68° and 64° respectively means 78°. I feel certain, however, that your apparatus is not accurate. The amount of water evaporated will not give so much humidity. My guess is that the meshes of your wick are not coarse enough. The Taylor Instrument Company and the Schaeffer-Beudenberg Company, both of Chicago, get out humidity tables.

Care of Thermometer.—*Sanitary writes: "Do you deem it advisable for everyone to have his own clinical thermometer? The reason I ask is that in a great many cases that have come to my notice the doctor simply rinses his thermometer off in a glass of water, dries it with his handkerchief or towel, and puts it back in the case. You no doubt are familiar with the manner in which the average physician handles his thermometer. He generally rinses it off in a glass of water just before using and directly after, and in a great many cases that is all the sterilizing the thermometer gets. Now, then, isn't it possible, knowing as we do that typhoid germs lurk in water, for the thermometer to infect the patient from being rinsed off in the water? In case there were no germs in the water, suppose the patient had a contagious disease of any kind? Isn't it possible that the thermometer would carry the germs and transmit the disease to the next one using the thermometer when said thermometer is cleaned in the manner described above?"*

REPLY.—An individual thermometer is safer but the risk is not great except in contagious diseases, including typhoid. In such cases, the thermometer should at least be washed in formalin solution, bichlorid solution or carbolic solution.

Stove Is Explanation.—*S. H. B. writes: "Apropos of your remarks recently on the use of gas stoves for heating, could the constant use of a ten-jet heater as the only means of heating a room used day and night account for chronic headaches of the occupant? The extremely severe weather necessitated having the stove lighted all day. A window was kept open at night for ventilation, but in the day time an open fireplace furnished the only ventilation, if any. After about three weeks my head began to ache, and almost never ceased, until with the spring weather the stove was no longer used and the windows were kept open day and night. The headache has now almost ceased. Is this situation sufficient to explain the headache?"*

REPLY.—It could. It did. It is.
Answered in three ways to prevent any misunderstanding.

Treatment of Furnace Heat.—*E. M. writes: "Nearly all hot-air furnaces are supplied with cast or wrought iron pans near the bottom of the hot chamber for the purpose of supplying water for condensing purposes, the idea being that this vapor will be carried into the rooms. Few people know about this or realize the importance of keeping the pan filled.*

"1. These water pans are not in the right place and are not efficient. They should be placed inside the hot chamber.

"2. People who live in furnace-heated houses should place a pan of clean water under the registers every day.

"3. Outlets inside the inlet incoming pipes will warm the air and interfere with circulation. The outlet pipes should go down separately from the inlet pipes and end in the cold air box, so the outgoing air will help in the draft and pass off into the chimney instead of coming back into the rooms.

"4. It is customary to supply cold air for the firebox from the front hall, but I have found it improves matters to have a cold air pipe dropped from the attic instead."

REPLY.—1. The water pans should be placed on the furnace inside the hot chamber as suggested by E. M.

2. The temperature of water in pans placed in the registers would not be high enough for effective evaporation. To place them in the hot-air chamber on top of or close to the furnace is the ideal, to place them in the register ranks second, on the register face, third.

3. To warm the incoming air by placing the intake pipes close to the outlet pipes will save in heating but will decrease efficiency. The colder the incoming air the more rapidly will it come in.

4. The plan of taking the cold air from the attic has the advantage of doing away with variation in the force and direction of the wind to a certain extent. The plan of running the outlet back to the firebox has some disadvantages. It will be difficult to make warm air go back down to the basement, and any plan that is based on such a mechanical idea will be found difficult to work. Furnace heating represents a great improvement over grate heating so far as comfort is concerned.

Keeping Off Frost.—*W. S. writes to know why grocery stores have fans in their windows. Why do some kinds of stores have more frost on their windows than others?*

Reply.—Grocers want their windows to display their goods. This they cannot do when the windows are frosted. Throwing hot air against the window keeps the temperature of the air next the glass above the dew point; therefore the windows sweat but little and frost less. When windows are chilling a room the same procedure will remedy the difficulty; when windows are leaking cold air the same procedure helps though not as much as proper stripping.

Those stores where the humidity is high have frosted windows unless the windows are fanned or there is a good deal of radiation just below the windows.

Lunch rooms and laundries are at the head of the list. Then come florists' shops and groceries. Butchers' shops are near the top. Dry goods stores and drug stores are low in rank as humid places. Hardware stores are lower still.

Furnace May Lack Capacity.—*E. C. B. writes: "I have lately had installed in my new residence an underfeed hot-air furnace. It has given us much trouble during the recent cold weather. When the first and second floors were heated to 70° the basement would be up to 90° and 100°. In other words, any degree of comfort in the living rooms was the result of superheated metal below—so hot that the outside jacket of the furnace would be hissing and sizzling. Does not this process lessen the life-giving oxygen? There is no provision for humidity. The furnace does not have the usual water pan in the casing. Our hardwood floors and furniture show the effect of excessive dryness. What remedy do you suggest for greater humidity, more oxygen, and freer air circulation with less heat in the basement?"*

Reply.—Probably your furnace has not capacity enough. Relief may come through storm windows, doors which fit snugly, storm doors, papered walls, and carpeted floors. If this fails a larger furnace should be installed. Air which comes in contact with red-hot iron is unfit. Water inside the hood is the best means of humidifying. Water below the register face in the floor or on the register is a poor substitute but better than nothing. You must blow out your house several times a day.

Would Save Heat.—*G. C. writes: "There is an idea that always bobs into my head when I consider the problems of humidifying indoor air, heating, and ventilating. When outside air is cold and inside air warm and moist, the moisture is lost by condensation upon the cold window glass. This condition prevents proper humidification and absorbs a lot of coal. Storm windows are objectionable, as they restrict ventilation, cannot be kept clean, are expensive, unsightly, and considerable bother, both in winter and summer. Why not fit the ordinary window sash with double glass, leaving one-quarter of an inch or one-half an inch of airspace as a thermal insulator between the two panes of glass? If this space were made airtight the glass surface within it would remain clean and the indoor surface would not act as a condenser and heat absorber. The saving in fuel would, I think, more than offset the expense. Also in extremely hot weather the outside heat could be more effectually shut out."*

REPLY.—The method would save heat. It would not help much with humidity.

Keeping Warm at Night.—*Athber writes: "I am 61 years young and in robust health. I occupy a large room on the second floor at the southwest corner of a detached house. There are three large windows in the room, one at either side of my double bed and one below the foot of the bed. The last window I use for ventilation at night. My habit is to have the lower sash up as far as it will go, which gives an opening of four feet wide by three feet high. The last two nights I have been miserably cold. The first of these nights I had it open the full measure, and the last about halfway up. The room has a polished oak floor. The bed is made up as follows: Upon a box frame mattress is a forty-pound hair mattress, a layer of heavy manila paper between the two mattresses, two four-pound single blankets, a padded cotton comforter, two sheets, a six-pound blanket, a wool-filled comforter, and another six-pound blanket. Last night I placed a rug on the floor under the bed so as to prevent the wood floor from drawing the heat out of the bed. Seldom do I use all the top covering above named, but during the last two nights all of it did not keep me warm. I have always been under the impression that I required less bed covering than is usual. Each morning upon waking the thermometer was about 35 degrees in the room."*

REPLY.—A man sixty-one years old cannot stand cold as well as when he was younger however well he may feel. I suggest that you raise the temperature of your room to 40°. You can do this by having more heat in the surrounding rooms and the room below. You might hang a comforter on the bed posts between you and the window so as to stem the wind.

I notice that you have a paper blanket between your mattresses but none over you. Put a paper blanket between the comforter and the top blanket. You can add a third blanket if necessary.

When the temperature outside is below 15° always put a hot-water bottle or electric heater between the sheets ten minutes before you go to bed.

If these suggestions do not suffice get a sleeping bag. The larger drygoods stores carry them.

Outside Air Necessary.—*Reader writes: "We are advised by a furnace man in order to save fuel, to have both fresh air intakes to the furnace come from inside instead of one from outside, trusting to opening doors and windows each day to air off the house. He cites hot water and steam heat*

as having no direct outside air. Is it right from a health standpoint as well as economical?"

REPLY.—The air supplying the furnace should be taken from the outside. To run the intake pipes through the basement so as in some measure to preheat the air is proper. But the air as it comes to the furnace must be outside air. Recirculated air is unhealthy. Whether the heating is done by hot air or by steam heat there must be air from the outside.

Storm Window Problem.—*A. F. P. writes: "Do you think it wise to put on a storm window that has an opening in the framework of only about 2 x 6 inches? My bedroom has the lake exposure, being two blocks from the shore, and the wind has full sweep. The question arises whether I should have the window put on or suffer on some bitter cold nights which we are likely to have. I contend it is better to be able to throw open wide the window, but, because the room is small, it is less easy to get away from the breeze than if the room were larger. There is an outdoor transom in the room, but the air from the top strikes me more than from the bottom, and, again, the size of the room makes it impossible for me to be far removed from the direct breeze. On the other hand, some winter nights are so cold that a storm window would afford considerable protection, but the landlady will provide only the one with the small slide."*

REPLY.—A bedroom should not have storm windows. The heat should be turned on and the windows should be left enough open to keep the temperature of the room during sleeping hours at or around 50°. The humidity should be around 70. A humidity anywhere between 60 and 80 is proper for a bedroom during the night hours.

So much for the use of the room for sleeping purposes. If you can sit in some other room in the house the problem of your sleeping room is easy. If you must use it as a sitting room I suppose you will be compelled to have the storm sash and the small opening but do not have the sash put on until Christmas and have it taken off by March 1. If you keep your room temperature as high as 70° on days when the outside temperature is lower than 10° above a lot of air will come in through the 2′ x 6′ opening except when a strong west wind is blowing. I judge your room is on the east side of the house. A strong west wind will always cause your transom to act as an inlet and your window as an outlet.

If you are employed during the day and spend no more than four waking hours a day in your room again the problem is easy. Equip yourself with a good warm wrap, woolen stockings and slippers of wool-lined sheepskin. Use these and do without the storm window.

Cold Sleeping Quarters.—*W. B. J. writes: "Is a lower temperature than 30° not as good as from 30° to 50°? For instance, the writer had constructed a room or inclosed porch at the rear of his residence 9 x 9 feet exposed on three sides, containing two windows on each of the three sides 2 x 5 feet, which are on hinges and can be kept open any distance desired. Naturally the temperature in such a room is the same as it is in the open air. Would you consider such a room in which the temperature goes below zero at times injurious to the occupant?"*

REPLY.—The sleeping arrangements described by you are most excellent. The room will not be injurious. On the contrary, using it will make you sleep better, feel better in the morning and do a better day's work as well as make you less susceptible to colds, pneumonia and con-

sumption. A lower temperature than 30° to 50° for a person properly equipped is advised unless there are individual difficulties.

Have Fresh Air Enter.—*W. G. writes: "Some months ago you cautioned your readers not to have a gas water heater in the bathrooms, unless it is connected with a chimney, saying that there had been deaths traced to that practice. 1. I wish to know if it is not equally true that the burners of a gas range would be also unhealthy, unless there was a hood over the burners and connected to a chimney. 2. Does the contact of the hot gases with the cold water pipes generate a by-product, different from that which arises from the fire of an open range? If so, what is it? I know of some recent instances when people were made sick and one of them fainted from using a hot-water heater not connected with the chimney. Hence I wish to know about the gas range, so as to take whatever precautions are necessary to be safe."*

Reply.—1. Yes. The danger is not as great because the room is better ventilated.

2. It prevents complete burning of the gas. Thus the air of the room is fouled by some unburned gas, some little soot (or unburned carbon); the oxygen is used up and carbonic acid and a little carbon monoxid are poured into the air. Use a stove with a flue or chimney. See that fresh air enters through the windows.

Proper Heat for Flats.—*W. A. N. of Urbana, Ill., writes: "Will you kindly inform us what is considered the proper temperature for a steam-heated flat building? We keep our house from 70° to 74° from 7 A. M. to 10 P. M. and some of our tenants complain of being cold. I tell them that most doctors advise 68° to 72°. Am I about right or not?"*

Reply.—Sixty-five to 68° is right for all the rooms except the bathroom and the dressing room. These should be at 72°. Bedrooms after 10 o'clock at night should be kept below 55° and better still below 50°. If your tenants complain of cold when the temperature as shown by a wall thermometer is at 74° two conditions exist—either the air is too dry or the room air six feet from the floor is 74° or over with the room air six inches above the floor under 70°.

Recirculating System Bad.—*J. M. R. writes: "Which is the best heating system—steam, hot-water, or hot-air furnace? You said in one of your articles that the humidity of steam-heated rooms is too low, and the air is too dry, which is correct? Is hot-water heat any better? What do you think about a hot-air furnace properly installed and with two cold-air returns, one for outside air and one for inside? The inside should be used when we have stormy weather."*

Reply.—Most of these questions have been answered in this chapter. The hot-air recirculating system is bad.

Keeping Warm Problem.—*L. W. L. writes: "Can out-of-doors sleeping and living in cold rooms be carried to such an extent that the body cannot supply sufficient heat?"*

Reply.—Sleeping and living out of doors does not interfere with the heat producing functions of the body. If anything, these are stimulated. The problem of keeping warm while outdoors or sleeping outside resolves

itself into one of muscular activity during the day and sufficient covering during the night. The body will produce more heat when sleeping out in the cold well covered than it will in an overheated room indoors.

Correcting Furnace Trouble.—*A. E. P. says that E. C. B.'s furnace trouble was due to an improper arrangement of the cold-air intakes. Last winter he had trouble keeping his house warm. He studied the air intakes and this winter readjusted them. In consequence he has had no trouble keeping his house at 68° to 75° this winter in spite of the cold weather. Last winter he used twelve tons of hard coal, this year (to February 15), seven, to heat a twelve-room house. He thinks a water pan inside the hood of the furnace will rust it.*

Reply.—A way can be found to keep up the humidity and prevent rusting. Inside the hood is the best plan for the water pan.

Not As Healthy.—*F. J. W. writes: "Please state whether in your opinion the heat from a gas stove is as healthy as the heat from a coal stove where there is not any steam heat, ventilation being secured by open windows at the top and bottom?"*

Reply.—As they are usually built, no. If there is a pipe to the outside and there is never any gas odor it will do.

Steam Heat Itch.—*S. H. writes: "I have lived in steam-heated flats for the last eleven years. Every year, as soon as the steam is started, I have the most intolerable itching and burning of the skin. My 3-year-old boy is affected in the same way. It does not seem to be hives—at least, there is no breaking out. Bathing seems to make it worse. I have rubbed myself with olive oil and cold cream, without any benefit. Of course, I suppose it is due to the excessive drying of the air by the radiators, which are nearly all low, and putting pans of water on them is out of the question. Lately I have been putting wet blankets on them. Will you suggest something for me to put on my skin? You have mentioned an instrument for measuring the humidity of the air. I have forgotten its name. I should like to get one. What I cannot understand is that, of all the people whom I know who are living in steam-heated flats, I have never heard anyone complain of suffering as I do."*

Reply.—Several have written to me complaining of itching of the kind described by S. H. We know that it is a disorder from which many people suffer. It begins in the autumn and keeps up until the heating of flats is stopped the following spring. Frequent bathing is of service but nothing is of much avail except to get out of steam-heated quarters.

S. H. is right. It is due to low humidity. The average relative humidity of a steam-heated flat after the weather gets cold will not be far from 25. At 75° F. each cubic foot of air wants about 10 grams of water. It has about 2.5 grams. In trying to get the balance it dries the skin so as to produce this itching. What is of more consequence, it dries the throat and lungs so as to produce a proneness to colds, sore throat, pneumonia and consumption. It does no good to use oils. The remedy is:

Change climate so as to get rid of the need of artificial heating, or

Change quarters by finding a living place where the air is more humid, or

Change the temperature of the room to say 60° when the air will not be so thirsty for water, or

Change the humidity by having a stream of steam blowing into the room or by having evaporating devices on the radiator.

HUMIDITY

FROSTED WINDOWS

As you go along the street in winter you will notice that some of the windows are clear and others covered with frost. Some of those which are clear are so because of fans which blow the warm air of the room against them, others because of large radiators beneath them, others because of double windows with a clear space between them, and still others are free from frost because the air in the rooms is so dry that it has no moisture to deposit.

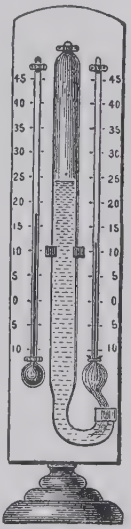


FIG. 487.—HYGROMETER COMPOSED OF WET AND DRY BULB THERMOMETERS.

Nothing is more frequent than to have janitors object to humidifying the air of the rooms because it makes the windows sweat and frost. That may be all right from the janitor's point of view but it is all wrong from the point of view of the woman who is to breathe the air. And whose say should go?

When air is at 72° and has 50 per cent humidity it is not far from right. If anything chills it to 52° the dew point is reached and the water of the air precipitates on the cold surface. On a cold day the window glass is far below this temperature and it follows that if there is not water on the glass there was little in the air—too little for the health of human beings.

Of this you can be certain: the house where the windows do not sweat and frost is not fit for human habitation. The school with clear windows is wasting the taxpayers' money, the teachers' time and the pupils' health. The office with clear windows is a place where employees have more than the average of colds, pneumonia and minor infections.

When the weather gets warm sweating windows have not the same significance. At that season they mean humidity which is too high for comfort and, in some measure, for health. In midwinter beware the house that has not frosted windows.

And what is the objection to frosted windows? None that I can see. They soften the light and make it even better for purposes of illumination than the direct rays of the sun. I have never heard any objections to sweating windows and walls that had any force to them. Of course, if the moisture on the walls is so extreme as to cause the paper to loosen, that is a different matter. But walls which chill enough to sweat like that are too cold to be sanitary.

METHOD OF HUMIDIFYING

Recently Dr. Peter Bryce of the Canadian interior department described for me a method of humidifying a house heated by hot water. He has used the method for several years in his own home and has had no difficulty in maintaining a humidity of 50 and even a little above. Incidentally he has had no difficulty in keeping the ferns growing in the house in healthy condition.

In his hot-water heater there is an evaporation chamber. This is fed from a tank located a few feet from the heater. The tank is of the type used in toilets.

It is provided with a float valve of the type used in toilet tanks. This

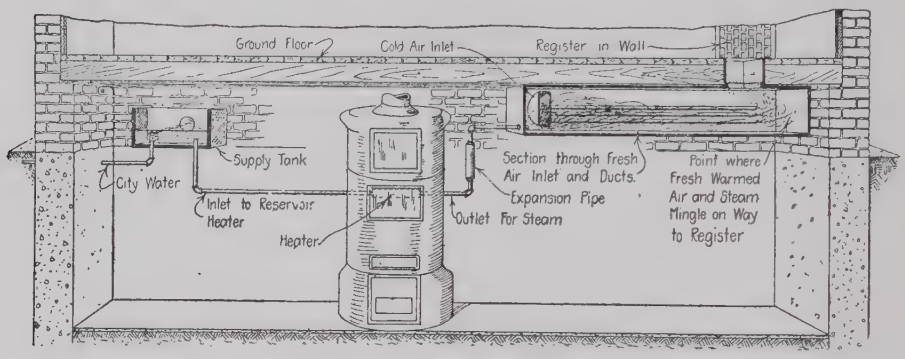


FIG. 488.—BRYCE METHOD OF HUMIDIFYING A HOUSE HEATED BY HOT WATER. Steam is generated in the firepot of the water heater. The steam is discharged into the air intake. The steam discharge pipe runs for some distance in contact with the air pipe before discharging into it. ("Domestic Engineering.")

valve regulates the feed from the tank to the evaporating pan. From this pan there is a duct which carries the steam to the rooms.

Somewhere along the way this duct is joined by the fresh-air duct. The fresh-air duct lies on top of and in contact with the steam duct. The fresh-air duct is divided by a vertical partition into two ducts except for a short distance. One of these ducts we will call A, the other B.

The fresh air flows along a duct to the end of the partition, then around the end into duct B, then along duct B to an opening into the steam duct. The object of this arrangement is to warm up the fresh air before it mixes with the steam.

If the ducts are long enough to warm the air in the length of a single tube the partition can be omitted so that the air is not carried around a sharp curve with the consequent mechanical difficulties. The mixture of steam and warm air then flows directly into the rooms.

It is to be understood that this is a ventilating arrangement. The heating is done by hot water in coils. As a ventilating arrangement it does not do away with the possibility of using the windows to freshen the house air from time to time.

In 1887 Dr. Bryce read a paper before the International Congress

of Medicine on the harm done by dry house air. At that early date he recognized that ordinarily heated house air dries out the mucous membrane whereupon these structures permit the germs of colds, pneumonia and contagion to get by.

Since he devised this method of humidifying he has checked its efficiency with an hygrometer. His opinion that it furnishes a solution of the problem of humidifying a hot-water-heated house is worthy of belief.

Sometimes we are told that humidifying the air will save coal. This is not true. Kimball says:

"A simple calculation will demonstrate that, approximately, four times as much fuel is required to evaporate the water required to produce 50 per cent humidity at 68 degrees as is saved by reducing the temperature from 76 to 68 degrees."

WHY FLOWERS DIE

When a woman has bought a nice fern in a pot of good, black dirt she wants to have it live. She places it in her sitting room and takes pride in its care. Presently she is distressed to find it dying. In her eagerness she may visit a florist to discover how he succeeds in keeping his plants alive while she fails.

If she goes to his greenhouse she will find the temperature around 70°, the humidity around 90, the ground fairly moist, and the plants getting some sunlight every bright day. When she goes back she finds that her plant is in air which is at 80°, with a humidity of 20, and maybe sunlight does not strike it. If she modifies the conditions her plant will live; otherwise it will not. She can bring the temperature as low as 70°. She cannot bring the humidity up to 90 but she can bring it up to 40 or 50 and she can give her fern some sunlight on days when the sun is shining.

Now people should have flowers in their offices and living rooms. They are esthetic and pretty and add to the charm of one's environment. Deep down in the heart of man there is a desire to see things live and grow. But these are of small importance as compared with the next three points.

Where there are animals plants are needed to maintain an atmospheric equilibrium; a city in a garden, a factory in a park, a house with flowers represent wisdom from the health and efficiency standpoint as well as from the esthetic.

Plants take up moisture from the ground and feed it to the air through their leaves; they condition the air for human occupation; and, finally, whether they thrive or die is a gauge by which the fitness of rooms for habitation can be determined. When rooms are so bad that flowers will not live in them wise people will move out. It is said that when rats are seen leaving a ship it is time for the passengers to get on rafts—when flowers die it is time for the occupants to get wise.

WET BULB THERMOMETERS

The humidity of the air is measured by an instrument called a hygrometer. The instrument advised consists of two thermometers set side by side. The bulb of one of these is surrounded by a loosely woven wick.

This wick draws water from a near-by cup so that from the surface of this bulb water is evaporating continuously.

This thermometer is called the wet bulb thermometer and its companion the dry bulb.

From the difference between the reading of these two thermometers the humidity of the air is found on a table attached to the instrument. Therefore, when one uses this kind of a hygrometer he has two thermometers at his service—one of the ordinary kind called the dry bulb and one of a kind new to him, the wet bulb.

Under ordinary office conditions in January he will find that the dry bulb thermometer registers about 16° higher than the wet bulb, say 72° and 56° respectively.

In talking about temperatures we always speak of the temperature shown by the dry bulb thermometer. Now, a group of physiologists are saying that the thermometer we ought to go by is the wet bulb. If we do we shall have to get new notions about temperatures altogether. Their argument is that the human body is a wet bulb and not a dry bulb. A man evaporates one or two pints of sweat from the skin every day. Therefore he is a wet bulb.

On this basis the temperature of the room is 56° instead of 72°, as he thought. Somehow he felt a little cold but it could not be—the thermometer read 72°.

If a man were to fall in a pond and go around with his wet clothes on he would be a wet bulb. As it is he is only a slightly moist bulb. To figure him on the same basis as the wet bulb is to overstate the case.

A compromise somewhere down the line, say about half way, would hit it off—such as to say that the temperature of the room for anything that is dry is 72° and for anything that is wet 56°, while for everything about as moist as a man it is 64°.

There is no doubt at all that the discomforts of extremes of temperature are better measured by the wet bulb than the dry bulb thermometer.

It is when the wet bulb thermometer shows over 70° that men keel over in laundries, in kitchens and in some factories. It is when the wet bulb thermometer shows under 56° that the throat dries out and colds are contracted, that the skin dries out and winter itch develops.

If a person can only afford one thermometer a wet bulb will tell him more than a dry bulb; yet he ought to have a dry bulb as it is what everybody refers to when they speak of temperatures.

The fact is, everyone should have both. It would pay to save in some other direction.

A PRACTICAL SUGGESTION

The suggestion relates to a method of humidifying air in a room heated by steam. On the market there are several devices which are to be attached to the radiator for the purpose of allowing steam to escape. The practice is to attach this device to the far end of the radiator, the end at which the steam leaves the coils.

One objection to these devices is that when several of the coils are filled with water, as often happens with poorly installed heating plants,

water escapes from the humidifier. The far end of the radiator is the water end. When the water condenses in the coils that end catches most of it. When the steam is turned on it blows the water from the forward coils to those at the far end.

The suggestion is that the humidifier be attached at the front end—the end where the steam enters, the end where you turn the steam on, the dry end. Generally the radiator coils have a plugged opening in this first coil. It has threads ready for the threads of the humidifier. By attaching the humidifier at this end water will not leak from it.

Professor Shepherd of the Chicago Normal College and a member of the Chicago Ventilating Commission reported the results of his investigations to the International Congress of School Hygiene. He found that proper humidity was most essential for the welfare of students and that ordinary schoolroom ventilation methods do not give proper humidity. In fact, schoolroom air generally is well below 30 per cent humidity, less than half of what it should be.

The comfort zone of the pupils under investigation was found to be fixed by temperature and humidity. One end of the comfort zone was 64° Fahrenheit and 55 per cent humidity. The other end was 70° Fahrenheit and 30 per cent humidity.

With a close, snug house we cannot have a humidity higher than 20 on a cold day without some form of humidifier. Humidifying a room heated by a stove, hot air or steam is not a difficult matter. How to do it is now generally known to those who are manufacturing heating appliances. It is up to the consumer to see that he gets proper apparatus.

DRY AIR

Now is the winter of our discontent
Made glorious summer by this sun of York.

Shakespeare tells us that *Richard III* (Act 1, Scene 1) thus expressed himself after the triumph of the White Rose faction. Converting winter into summer did not stop with the days of Richard III. Suns of York, now called radiators, hot-water pipes and hot-air flues, are converting winter into summer. Most people spend the greater part of the day in winter in hot air—air that is hotter than room air in summer.

In summer they take their warm air in the open. In winter they take it in closed rooms. In summer the hot air was heated while in contact with lakes, rivers and wet ground. In winter it is heated while in contact with iron pipes and dry walls.

The following figures are taken from an article by McCurdy in the *Heating and Ventilating Magazine:*

"With atmospheric pressure at approximately 30 ins. and the temperature at 0 degrees Fahrenheit, a cubic foot would hold 0.481 grains of moisture; at 32 degrees F., it would hold 2.113 grains of moisture; at 60 degrees F. it would hold 5.745 grains; and at 70 degrees F. it would hold 7.98 grains.

"Vapor or space at 0 degrees F. and 50 per cent relative humidity would

contain approximately 0.24 grains of moisture per cubic foot. This vapor, on being heated to 70 degrees F., would still contain its absolute humidity of 0.24 grains of moisture per cubic foot, but its relative humidity would drop from 50 per cent to 3 per cent, except as the air passages and skins of pupils became water jugs which were continually emptying water from the bodies of the pupils into the air of the room.

"Air at 32 degrees F. and 50 per cent relative humidity would contain approximately 1.056 grains of moisture per cubic foot. This air, on being heated to 70 degrees F., would then have a relative humidity of 13 per cent unless moisture was added from the pupils, walls, or fixtures in the rooms."

This summer air in winter time is drier than the air of Arizona or any other dry region in this country. It dries out the skin causing winter itch; it dries out the hair causing baldness; it dries out the nose causing colds; it dries out the tonsils causing enlarged glands; it evaporates moisture from the skin so fast as to make us feel cold even when the air is over 70°.

If we are to have this summer in the winter time let us duplicate the entire process. Let us have some rain; or by some sort of device bring the humidity of the room air up to the summer standard.

The first step is to know. To have thermometers exposed here and there is an excellent idea. To have hygrometers exposed just as abundantly is just as good an idea.

For several years I have advocated hygrometers in the schoolrooms. I have not heard of anybody putting the plan in practice but somebody will before long. In time it will become universal.

When the people learn the facts they will proceed to remedy the bad conditions. Humidifiers are on the market. They are not so well developed as heaters but the engineers have not been working on the problem so long. At the present time there are several types of humidifiers on the market.

The man who insists will get a humidifier in his hot-air furnace. The indifferent man will not. The man who insists will get humidifiers on his radiators.

Not until the air is properly humidified will the winter of our discontent be made glorious summer.

GET THE HYGROMETER HABIT

If you will turn to the weather report on the first page of almost any newspaper you will find the temperature and the relative humidity among the items of information. By a relative humidity of 90 is meant that the air contained nine-tenths as much moisture as it would hold at that temperature. In hot weather when the humidity is over 90 the days seem much hotter than the temperature shows they are. In cold weather with the same relative humidity the days seem colder than they are.

When the relative humidity is around 70 conclusions drawn from your feelings jibe with what the thermometer says about it. The discomfort of the climate of the lake cities is due to their high humidities. It is by reason

of better humidities that inland cities—for example, Minneapolis, St. Paul, and Denver—have the advantage of us.

But the purpose of this section is to tell of indoor humidities. The Commission of Labor of New York has found that the following trades usually work in places with a harmfully high humidity: Printers, clothing makers, bakers, pearl button makers, cigar makers and laundry workers. The list is incomplete. Discomfort, harm and lowered efficiency come from working in a place with a high humidity. Artificially heated schools, offices, some stores and all living rooms have a harmfully low humidity ranging from 50 down to 10.

So while we are getting good habits let us get the hygrometer habit. Hygrometers are cheap and almost as easily read as thermometers. Bedrooms should have them but they are more needed in living rooms. Schoolrooms certainly should have them. Offices are much more in need of them than of registering clocks. All factories and workshops should be equipped with them.

Then, when they are installed, somebody should make a record of what they show. The manager of a factory or large office should have the records of temperature, humidity and absences from sickness placed on the desk every day. In larger and better organized plants these records should be supplemented by efficiency data.

RAISING THE HUMIDITY

Much the best thing to do to raise humidity is to have a steam jet discharging steam into the room. This can be done by removing the small vent and substituting for it a tube long enough to discharge the steam away from the wall and to prevent water from blowing into the room. Steam discharging in this way makes a noise and, occasionally, results in odors. If the radiators are so arranged that the condensation flows back to the basement the tendency to squirt water is reduced to a minimum.

Ordinary pans of water on the radiators help but little. The evaporation from them cannot possibly raise the humidity more than ten points. Humidifiers help but little. The water surface exposed to the air is not large enough.

Next in efficiency come kettles of water setting on the stove. More steam will escape from the spout of a tea kettle than will rise from a pan one by two feet.

Next come growing flowers. If several boxes of growing flowers be kept in the room and the soil kept as wet as they will stand soil evaporation and plant exhalation will add much moisture to the air.

Next comes a sprinkling fountain. A small spray nozzle can be attached to an ordinary tap and turned on just strong enough to get a fountain effect; or a small electric fountain can be installed. It will seldom be necessary to go to the expense of a more elaborate fountain.

Next come large coarse sponges placed in pans of water. There should be several of these, a dozen in an ordinary sized flat. The cheaper, coarse-grained sponges serve best. The closer they are placed to the heat and the more the air circulates over them the better.

Next come pans of water. These should be kept on the radiators and

near the intakes. The pans should present the largest possible surface to the air. Pans which are less than one foot wide and two feet long do not do much good. By using two such pans and placing them on the radiators, the humidity can be raised about ten degrees.

Lastly comes the use of patent humidifiers. These hang on the radiators and the water in them gets approximately as warm as the radiator coils.

Arrangement for Humidity.—*H. B. W. writes: "Relative to your remarks from time to time as to keeping the humidity of the air in living rooms at a certain point, I have found that common lard pails suspended in hot-air registers on sticks (laid diagonally across the air ducts) will aid materially, provided water is kept in them. My experience is that they need to be filled about twice in three weeks, although this would probably vary according to the heat coming up from the furnace. At any rate, the scheme has this to recommend it—it costs nothing and will certainly do away with a large percentage of the dryness caused by hot-air heat."*

Reply.—There are several kinds of hygrometers. The one best adapted to household, office, and factory use is composed of a wet and a dry bulb thermometer. A dry bulb thermometer is an ordinary thermometer. When this reads 70° and the wet bulb reads 63° the humidity is 68. A dry bulb reading of 70° and a wet bulb of 62° means 64 humidity; 61° means 60; 60° means 56; 59° means 52; 58° means 48; 57° means 44; 56° means 40; 55° means 36; 54° means 33; 53° means 30; 52° means 26.

A great many people write that they are surprised at the low humidities which they are discovering. Some of these relate to living rooms, some to offices, and a few to factories.

In the natural course of time the humidity of rooms will get lower as the winter progresses. By January the walls will be dried out and the furnaces and boilers will be harder pushed. The room humidities will certainly average ten degrees lower than at the present time (November, December).

More people are asking how the humidity can be raised.

When an ordinary living room temperature is kept at 70° it is difficult to bring the humidity above 40. If there is steam heat a jet of steam discharging into the air can be so arranged as to bring the humidity to 70. The objections are the odor and the noise.

If there is no steam water can be evaporated by humidifiers, pans of water, wet towels and wet cloths, fish bowls, fountains, tea kettles on the stove and so on.

The greater the evaporating surface and the warmer the water the greater the evaporation. The stronger the air currents over the water the more effective the evaporation.

With improvised evaporators it is almost impossible when the temperature of the room is 70° to get the humidity on a cold day over 40.

Cold bedrooms and cold schoolrooms are different. When the windows are thrown open and the temperature is 55° the humidity will be around 70 without the use of any humidifiers.

Ideal Humidity.—*T. L. D. writes: "What is the ideal humidity for living and sleeping rooms, and how can it best be obtained and regulated?"*

Another writer asks what is a hygrometer. Still another asks what type is recommended.

REPLY.—The ideal relative humidity is 70. A sleeping room should have at least one window wide open. Under these circumstances the humidity takes care of itself. A living room should have a temperature of 68° F., as shown by the dry bulb or ordinary thermometer, and a wet bulb thermometer recording 61° F. Seven degrees difference in the wet and dry bulb thermometer readings means a relative humidity of 67. To get this humidity it is necessary to expose vessels of water in the room, to use some of the humidifiers, of which there are many on the market, or to have a small nozzle attached to the steam radiator in such a way that steam will blow into the room.

What is a hygrometer? There are four types in use; the wet and dry bulb hygrometer, the sling hygrometer, the hair hygrometer and the small cheap weather indicators. Of these the wet and dry bulb is to be preferred. They are not patented. They are made by different people and can be had at any instrument store. The apparatus is really a thermometer and a humidity measurer combined. The dry bulb thermometer costs $1; a fairly good hygrometer consisting of two thermometers, water carrier, wick and tables costs $2.25 to $2.50. A person owning a hygrometer needs no additional thermometer.

Dry Air Explanation.—*W. H. S. writes: "Dry air in a room, I am told, irritates the lungs. Dry air in the higher altitudes is a tonic and is healthful—or something like that. I have asked several physicians, but so far have received nothing more than that it seems to be so. I get no reason for the difference. If you think it worth while please explain."*

REPLY.—The common way of putting this question is: If dry air in the arid regions is good why is dry air in a schoolroom or office bad? The answer is: The dry air of an arid region is good for one condition—consumption. It is not good for the skin or for the general run of disease.

The air in the arid regions is never so dry as is the air of the schoolroom. In Arizona the humidity is usually around 50; in the schoolroom it is around 20.

In the arid regions all the air is dry. In a moist climate where only the schoolroom air is dry the person spends several hours a day in air around 20 and the balance of the day in air around 90. Where the outside air has a temperature of 40° or below and a humidity of 90 and the inside air a temperature of 70° or above and a humidity of 20 or below, the mucous membranes of persons passing from the one to the other condition are put under great strain.

Bad Air Effects.—*F. C. P. writes: "1. What are the bad effects of air lacking moisture? What amount of water should be evaporated daily in a room 16′ x 16′ with ten-foot ceiling, heated by hot water? 2. What is the best, quickest, and simplest method of supplying moisture in air? It seems almost impossible to evaporate a large quantity by simply letting water stand. 3. Are there quicker methods and what are they? 4. Is there an instrument for measuring the moisture in air? 5. Could you name any medical work treating fully on the moisture in air question?"*

REPLY.—1. Dries out the skin and mucous membranes. In this way it predisposes to colds and enlarged glands. It causes winter itch by drying out the skin.

2. One to three gallons. The amount will depend on the temperature and humidity of the outside air.

3. In rooms heated by hot water use the Bryce method.
4. Yes; wet and dry bulb thermometer. It is called a hygrometer.
5. "MacFie on Air."

Between 50 and 70.—*W. B. writes: "What is the right humidity of air in living rooms? Can you give a simple and inexpensive way to keep the different rooms upstairs and down at the right humidity for children and others compelled to live indoors?"*

REPLY.—It should not go below 50 nor above 70. A hygrometer shows the humidity as a thermometer shows the temperature. How you can humidify depends on how you heat. The method is to evaporate several gallons a day for a small dwelling and to arrange it so that the evaporated moisture stays in the rooms. If the heat is by furnace the water pans must be in the air chamber over the firebox.

Peril to Picture Operators.—*T. T. writes: "Kindly inform me as soon as possible as to the sanitation, ventilation, and healthfulness of the operators' booths in moving picture theaters."*

REPLY.—About the worst ventilated places in town are the moving picture theaters. There are some exceptions to this statement. The booths are much the worst place in the hall from the sanitation standpoint. The reasons are:

1. The booth is in the gallery where the air is hottest and filthiest.
2. The heat of the light makes the booth hotter still.
3. The films are inflammable.
4. The films usually have some specks on them and the consequent flashing, when added to the dancing of the pictures, is ruinous to the eyes if kept up long.
5. The visitor stays an hour or two and then goes. The operator stays there several hours and is back the next day. For these reasons the "sanitation, ventilation, and healthfulness" are about as bad as bad can be. Quit the business and go into something safer.

Should Have Hygrometers.—*Mrs. L. T. Le B. writes: "I am anxious to have your opinion concerning the ventilation and general atmosphere of the public schools of our town. So many pupils complain of headache and bad colds are so prevalent that it seems to me that present conditions in that regard may be the cause. The schools are ventilated by the fan system with closed windows. 1. Do you not think that the windows should be opened at the noon hour, which is between sessions, or even more often? The janitors in all our public buildings are against airing, saying it is hard to raise the heat afterward. 2. Now, regarding humidity, the schools are heated by steam, with no receptacles for water on the radiators. Do you not think that pans of water should be attached to every radiator? My child is only one of many who return from school with a headache and feeling generally debilitated. Hearing so many complaints I have tried to find out the cause and it seems to me that dry, foul air may be the reason."*

REPLY.—1. Yes.

2. Yes, though they will not help much. Not enough water will be evaporated. A better plan is to allow steam to discharge from the radiators into the room. A fan system does not give ventilation sufficient for health and as usually installed is productive of just the kind of ill health described in your letter.

I wish you could persuade your school authorities to equip your schools with hygrometers and then to have hourly observations recorded showing the temperature and humidity. With this information in hand your board will be in a position to plan improvements and you will be equipped with information on which you can stand in demanding improvements.

Have Humidifier Attached.—*W. G. writes: "I have steam heat in my house, and have a hygrometer. However, I am ignorant of what the proper humidity should be, and the table with the instrument fails to tell. As my radiators are closed ones, I cannot admit moisture from them through an air valve, as was recommended by you some time ago. I notice that dishes placed on radiators do not seem to produce much effect. A concern in New York is making small fountains run by a little electric motor and pump, throwing the water in a spray a foot or more into the air and continuing as long as the current is turned on and the basin contains water. This is made primarily for ornamental purposes, but if run for an hour or so a day, would it provide the proper humidity? I do not know where to find anything made for steam radiators to provide humidity."*

REPLY.—Around 50 is the best humidity, all things considered. A steamfitter could attach a humidifier to your radiator. I have had no experience with the spray device but my offhand opinion is that it would give you enough humidity.

Dry Air and Moist.—*J. V. N. S. writes: "I see you seem to hint that dry air is unhealthy, and the same may be said of a dry climate. Are not those cities situated in a dry climate the healthiest? I should like to see the proof that moist air is healthier than dry air. My residence is a two-story brick house, fairly large, with a basement. It is heated with hot air. The first two years, water was kept in the furnace boiler, damaging paper, curtains, and furniture in the rooms. For forty years my house has been heated without water in the boiler. My family has breathed the driest air that it was possible to make, and it would be difficult to find a healthier family. I have not had the appearance of a cold for more than two years. From cellar to garret, we have endeavored to keep the air in our house as pure as the air out of doors."*

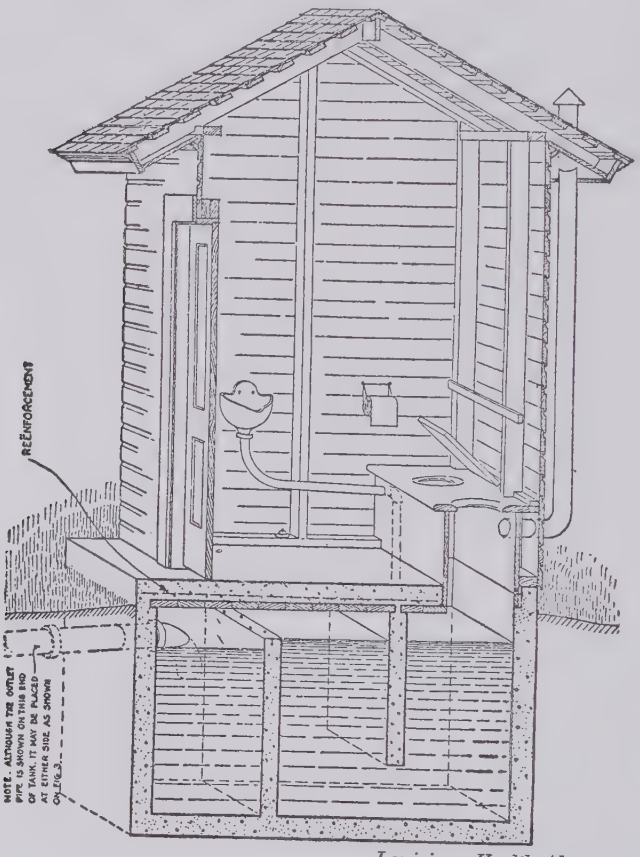
REPLY.—A dry climate is better for certain diseases than a moist one. On the other hand a moist climate is better than a dry one for other diseases. The dry climate of the West is better for consumption than the moist one of Illinois.

However, a distinction should be made between the effects of dry outside air and dry inside air. If you have been going around out of doors in an atmosphere with a relative humidity of 90 and then go into a house where the relative humidity is 25 you will suffer from the change. The inside humidities which do harm are those that are under 50. There is no climate where people live which has a humidity as low as this.

On the other hand, if the air in a room has a humidity over 70 it is distinctly bad. My contention is that healthy air is air which is not too wet and not too dry. The humidity of inside air must not be more than forty points lower than that of the outside.

You have been fortunate in escaping colds but it would not be possible to draw any conclusion as to why you have escaped them without knowing more about you and also more about the humidity in your house. For all that your letter conveys the humidity may be pretty high.

Good Compromise Humidity.—*J. W. S. writes: "We have a pan of water two and one-half by six feet in each fan of our schoolroom, which is kept boiling by means of steam pipes, and all this vapor goes along with the air into the schoolrooms. We are thus able to increase the humidity in our schoolrooms from 12 to 18 per cent above what it would be if*



Louisiana Health Almanac.

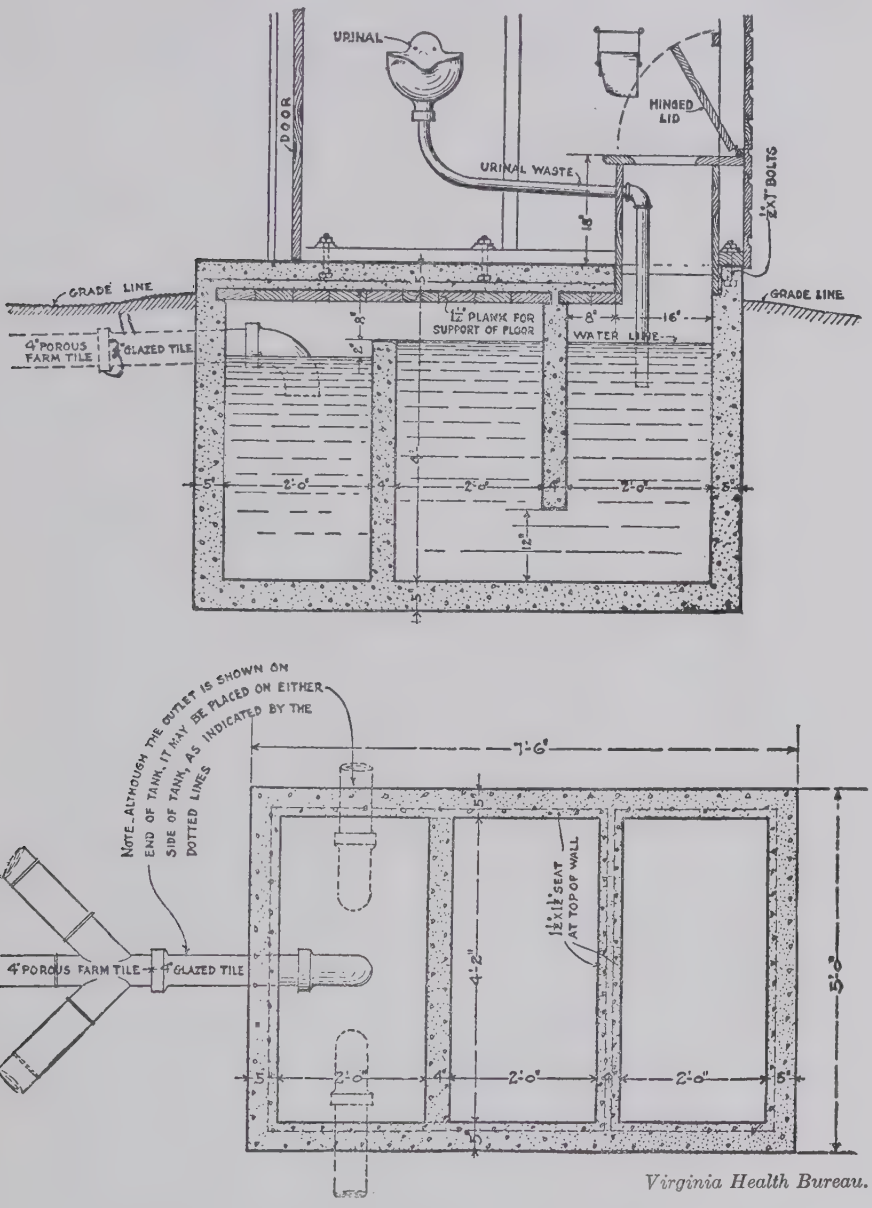
FIG. 489.—KENTUCKY TYPE PRIVY WITH SEPTIC TANK.

the vapor were not added. On the cold, clear days the highest per cent of humidity we are able to get by this method is about 45. Will you kindly tell me what should be the per cent of humidity in our schoolrooms? I believe we can increase our humidity by increasing the size of our evaporating pans in our fan rooms."

REPLY.—The humidity should be 70 but 45 is a very good compromise. Your walls would sweat disagreeably if you went much higher; that is, if you heat by hot air introduced on the inside wall. Shallow pans of water kept boiling by steam pipes constitute an excellent method of raising humidity. You are doing well.

Radiators and Humidity.—*M. H. R. writes: "Will you kindly explain how you fixed your radiator to keep up the humidity, a matter to which*

you made reference some days since? We have hot water heat, and have several galvanized iron cans that hang on the back of the radiators, holding water which evaporates so slowly that I think they are inadequate. I am anxious to hear of something better."



Virginia Health Bureau.

FIG. 490.—SPECIFICATIONS FOR KENTUCKY TYPE SEPTIC TANK.

REPLY.—M. H. R. is right. The amount of water that can be evaporated from an iron can is far from being enough. I bought for my radiator

a wood wheel air valve at a quarter or thereabouts. I screwed off the small valve on the side of the radiator and screwed this on its place. When I want to increase the humidity I turn the small wooden wheel and steam blows into the air. When there is enough I turn it off. The objection is the noise it makes. The engineers say that if everybody did this the janitors would be compelled to watch the water in the boilers more closely.

There are several methods in use designed to overcome the shortcomings of this simple arrangement. In one group are the silencers devised to prevent the noise. Another apparatus is one to prevent the lowering of the water in the boiler.

At the Lane Technical High School (Chicago) the engineer, Mr. Stoltz, humidifies the air by the following method: He has built two galvanized iron tanks, each 60″x18″x18″, in the hot air chamber. In each tank he has placed sixty feet of one-half-inch brass pipe through which steam circulates. The water in these tanks is kept at a constant level by the float valve. In cold weather these two tanks evaporate 750 gallons of water a day.

The morning I was there the water in these tanks was boiling actively, and a cloud of steam was rising and entering the air duct. The teachers tell us the relative humidity of the schoolrooms is around fifty. They say the air is pleasantly moist and pleasantly warm. Mr. Stoltz tells us that he finds it easier to heat the school satisfactorily since this apparatus was installed.

Call in Steamfitter.—*C. S. writes: "What sort of humidifier would you suggest for use on a radiator heated by 'atmospheric pressure'? It is really steam heat carried from a central heating plant, but there is no possible way of allowing the steam to escape into the room. Since installing this system I find that whereas our hot water plant kept us comfortable at 70° this heat must be 75° or I am chilly. Is it possible for the difference to be caused by the different systems?"*

Reply.—Your steamfitter can fit a steam discharger into your radiator. A room in which the air is humidified is more comfortable at 70° than one in which the temperature is 75°, but the humidity is wrong. However, on this point hot water heating offends just as much as does steam heating. If the placing of coils is such as to heat the room unevenly the occupants will complain of the cold at 75°. If the heating is even they will not complain at 70°.

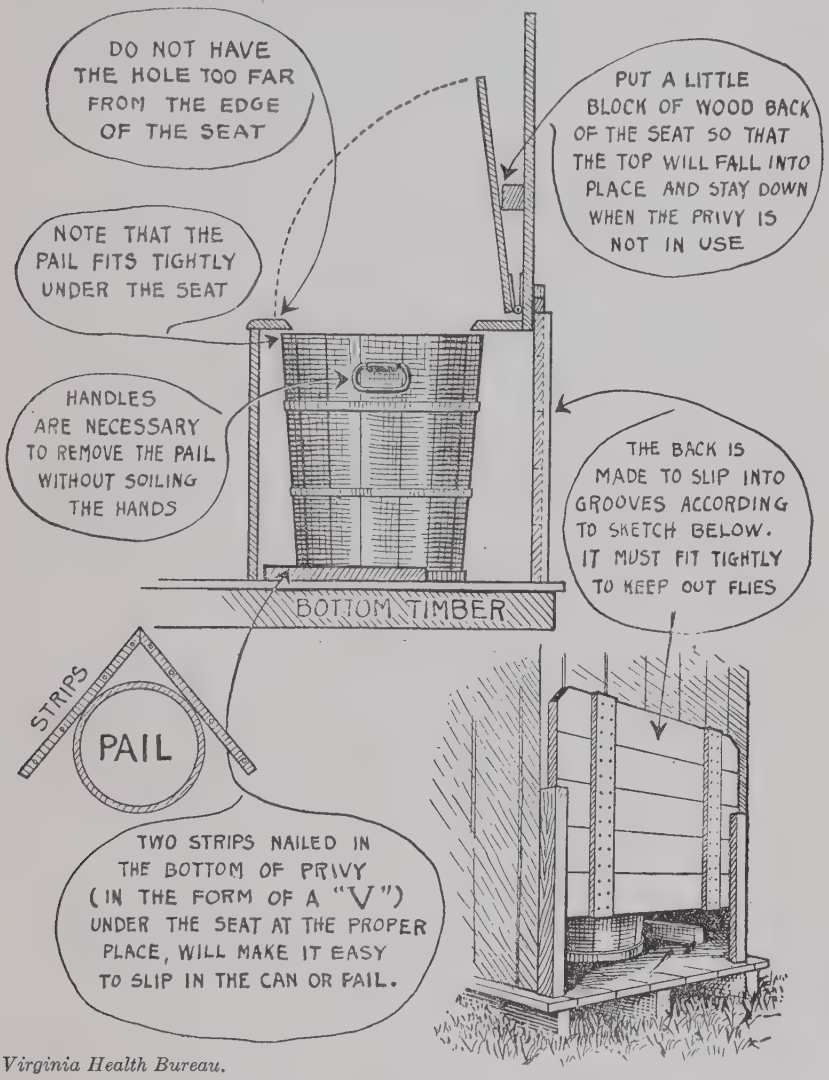
My guess is that the coils are not so well placed as in the old installation. Maybe the house is older and more cold air leaks in; so in consequence your head is in air at 75° and your feet in air at 60°.

Plan to Increase Humidity.—*P. W. A. F. writes: "Your articles concerning humidity in dwelling houses have received my careful attention and I fully realize with what difficulty the person who desires to humidify his rooms which are heated by hot water radiation is confronted. The following plan, I believe, will greatly aid the conditions in the average dwelling.*

"This is the placing of a rather deep yet long, narrow pan between each radiator and the wall and filling this pan with water.

"A large evaporating surface is then secured by suspending a sheet of some absorbent material, such as loosely woven table padding, so that one end is immersed in this tank and the other end extends nearly to the top of the radiator and throughout its length. I shall be glad to have your opinion of this plan, for I intend to put it into operation."

REPLY.—Depends on the surface and how hot the water gets. If it evaporates one to two gallons of water a day it will give excellent results for an ordinary-sized living room or office with one or two occupants. The simplest test is to measure the amount of water evaporated.


DO NOT HAVE THE HOLE TOO FAR FROM THE EDGE OF THE SEAT
PUT A LITTLE BLOCK OF WOOD BACK OF THE SEAT SO THAT THE TOP WILL FALL INTO PLACE AND STAY DOWN WHEN THE PRIVY IS NOT IN USE
NOTE THAT THE PAIL FITS TIGHTLY UNDER THE SEAT
HANDLES ARE NECESSARY TO REMOVE THE PAIL WITHOUT SOILING THE HANDS
THE BACK IS MADE TO SLIP INTO GROOVES ACCORDING TO SKETCH BELOW. IT MUST FIT TIGHTLY TO KEEP OUT FLIES
BOTTOM TIMBER
STRIPS
PAIL
TWO STRIPS NAILED IN THE BOTTOM OF PRIVY (IN THE FORM OF A "V") UNDER THE SEAT AT THE PROPER PLACE, WILL MAKE IT EASY TO SLIP IN THE CAN OR PAIL.

Virginia Health Bureau.

FIG. 491.—CHEAP SANITARY DRY EARTH BUCKET PRIVY.

Efficient Humidity Plan.—*X. Y. writes: "For the benefit of your readers who are trying to solve the humidity problem in hot water heated houses, I have thought you may be interested in a scheme which seems efficient if not elegant. Underneath the radiators are placed shallow galvanized pans, as large as the setting of the radiator will allow. (Under our low radiation the surface area is 12 x 50 inches.) From these water pans wicks are carried up between the radiator sections. For wick ma-*

terial we find the ordinary paper towel sheets, loosely rolled, most satisfactory, as they can be renewed at practically no expense when dust-clogged. The amount of evaporation can be controlled by the nmuber of wicks. With no wicks there is practically none, but with a goodly number we have at present even with a high relative humidity out of doors a daily evaporation of between three and four gallons in four rooms so fitted. Whereas before installation the house humidity was about 30, we now have an average of 43 or 44 with great mucous membrane comfort."

REPLY.—This is very efficient.

Humidity by Pans.—*H. L. O. writes: "Is it necessary to have hot water pans on hot water heat radiators to obtain correct humidity?"*

REPLY.—It is necessary to do something. Pans will help, though you will need more moisture than they will furnish.

Use the Hygrometer.—*D. D. S. writes: "Will you be so kind as to outline an easy method of approximating humidity percentage? Can sufficiently accurate results be obtained if barometric pressure is ignored? If so, will you state what difference in degrees between wet and dry Fahrenheit thermometers will indicate less than 50 per cent saturation, the temperature (dry) being from 68° to 70°?"*

REPLY.—The wet and dry bulb thermometer combination called a hygrometer is the simplest instrument which I can recommend.

Yes, barometric readings may be ignored in considering humidities. When the dry bulb reads 70° any wet bulb reading less than 59° means less than 50 relative humidity.

Room Needs Moisture.—*E. H. writes: "The temperature of our rooms does not go above 72° and there is constantly a window open from the top about six inches in every room. The windows are never frosted in weather about 16 or more degrees above zero, although in below zero weather they are frosted. Is the humidity too low?"*

REPLY.—A room kept at 72°, with ventilation through a window down six inches from the top, will need moisture. A room kept at 55° and ventilated through wide open windows will not require additional moisture.

Humidity Should Exceed 40.—*T. F. S. writes: "I have a 'hair' humidometer in my office, and such a day as today—February 2—I have difficulty in keeping the humidity of my office so that it will register as high as 35°. Even when placed outside my window, 150 feet above the sidewalk, the humidometer registers only 31 degrees. Is it necessary to have the humidity of the room higher than the outside air?"*

REPLY.—Hair hygrometers are seldom accurate. The government report shows that the relative humidity at 7 A.M. on February 2 was 57 per cent and at 7 P.M. was 43. Keep your room humidity at 40 to 60. In Chicago in winter the outside humidity is usually higher than that.

To Make a Hygrometer.—*W. C. E. writes: "Can a hygrometer (the wet and dry kind which you have mentioned) be made by me from two ordinary thermometers? I have two thermometers, and would like to have the hygrometer. If this can be done, will you please tell me how it may be done and how to read it?"*

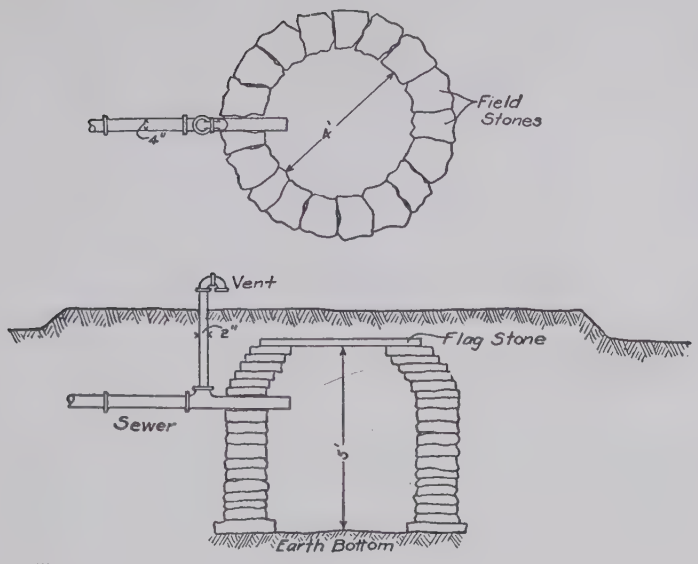
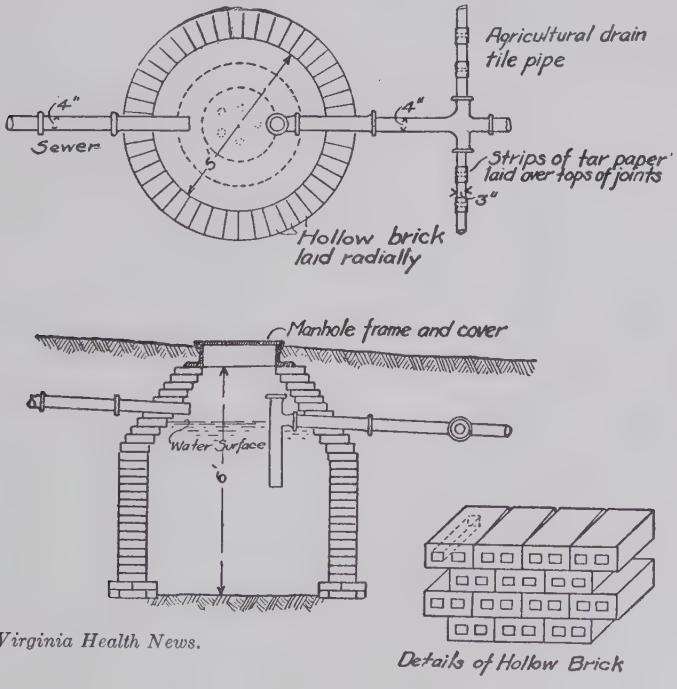


FIG. 492.—LEACHING CESSPOOL CONSTRUCTED OF FIELD STONES.

REPLY.—Take a small lamp wick, sew one end around the bulb of one of the thermometers, put the other end in a small cup of water. Stop in some instrument dealer's and get a table of relative humidities as shown



Virginia Health News.

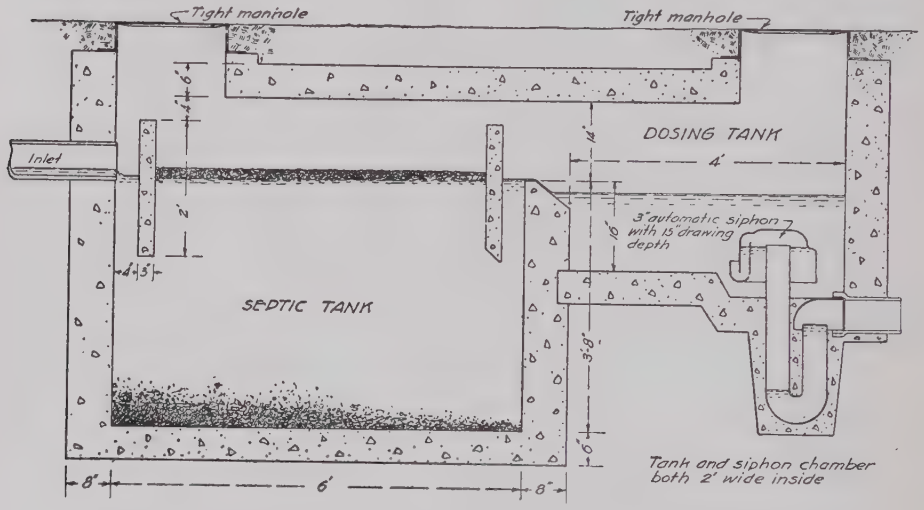
FIG. 493.—HOLLOW BRICK CESSPOOL WITH OVERFLOW INTO AGRICULTURAL TILE.

by the difference between wet and dry bulb. When the dry bulb is at 70° and the wet bulb is at 62° the humidity is about right.

Humidity Discussed.—*Mrs. W. B. writes: "Please tell me how hot water radiators can be fixed so there will be enough humidity in the room."*

Reply.—I do not know any satisfactory way to humidify the air of a room heated by hot water. Pans attached to the radiator do not furnish enough moisture. Perhaps some reader will propose a plan.

Air Too Dry.—*Reader writes: "I have been bothered this winter with an itching on my body. No breaking out is visible until the skin has*



California State Bulletin, May, 1916.

Fig. 494.—Concrete Septic Tank and Dosing Chamber Attached, for Household of Not Over 10 Persons.

been rubbed or scratched. Then little white pimples are raised and itch terribly. What is the trouble and what can I do for it?"

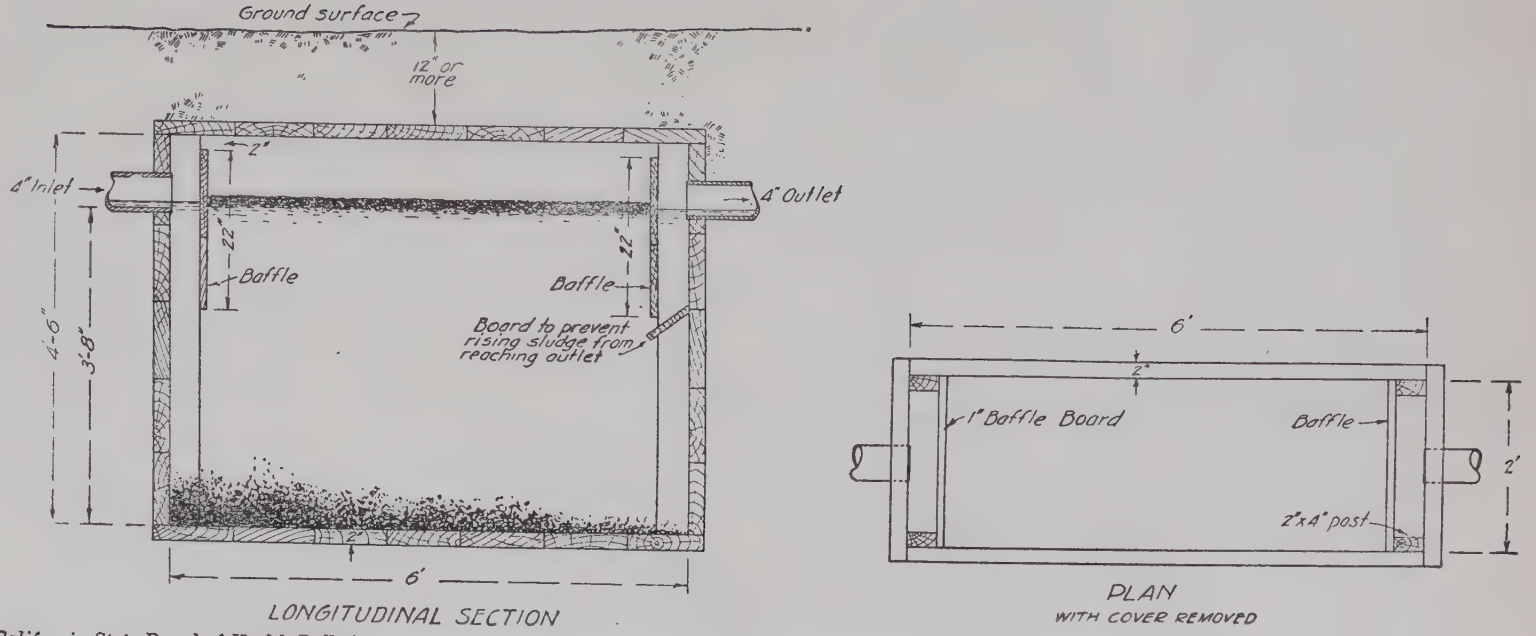
Reply.—The air in your living room is too dry. Get a hygrometer. Add humidity to the air until the hygrometer shows over 40 constantly. At that time the itching will disappear. Otherwise it will persist until the heat is turned off in the spring.

More Humidity Needed.—*O. A. C. writes: "Is our furnace man right when he says we do not get the heat we should have because of the two-quart pails suspended in several registers? He insists the small water pots in furnace are sufficient."*

Reply.—No. Two pails of water suspended in the registers will not use up enough heat to affect the temperature. Neither will they evaporate enough moisture. They help but do not suffice.

Itching from Air Too Dry.—*J. C. has an itching of the skin which nearly sets him crazy. He wants to know what he can do.*

Reply.—You are living in air which is too dry. See that the humidity of the rooms gets up to, say, 70°.



California State Board of Health Bulletin.

FIG. 495.—CHEAP WOODEN SEPTIC TANK FOR HOUSEHOLD OF NOT OVER 10 PERSONS.

Dirt Bands on Ceiling.—*Mrs. R. W. wants to know why the ceiling of her room is striped with alternating bands of light and dark and why this is more plain near the radiator than elsewhere.*

Reply.—The plastering is put on over laths. The wooden laths are better conductors of heat than the air spaces between them. Therefore the plaster over the laths is colder than that over the spaces.

The water in the air precipitates at the colder zones and the moisture catches the dirt out of the air. The dirty band marks the location of the lath, the clean that of the space.

The space over the radiator shows this more plainly because the hot air from the radiator flies straight to the ceiling, carrying dust and sticking it there.

North Carolina Health Bulletin.

Fig. 496.

Winter Itch Cure.—*Mrs. M. W. writes: "Last winter my husband and I somehow acquired what we thought was winter itch, but what our physician declared was plain, dirty, old itch. The skin looked perfectly healthy, but itched violently in spots, and, after scratching, would look red and like goose flesh. It traveled all over the body (except the face), but, as a rule, seemed to be active in only a comparatively small area at one time. After several weeks it developed (at the base of the fingers only) in rather hard flesh that scaled off, always accompanied by the violent itching, but on the rest of the body it continued in the form first described. We tried various salves, etc., which relieved temporarily, but did not cure. It finally left us with the coming of the warm weather last June. It has reappeared on me with the first cold weather this fall, simultaneously with the wearing of last winter's union suits, but not on my husband, who has not yet put on heavy underwear. Is this a parasite or a skin condition? We wear cotton underwear; perspire normally; bathe often. Is there any relief?"*

Reply.—You have winter itch, I should say. This condition results in part from the warmer, more irritating underwear. Much the more important cause is dry air. No local treatment, except frequent bathing to remove the dead skin, is of service.

The remedy is water. Drink more of it to increase the amount of perspiration. Above all, put more water in the air of your rooms. Get a

hygrometer and keep the humidity of your rooms up to 50 or above and your itch will stop.

Your husband does not stay so closely at home and in consequence his itch is lagging a few weeks. It will get him before Christmas.

Winter Itch Treatment.—*W. K. F. writes that after suffering from winter itch for many years he found a cure. It is glycerin, one part; water, eleven parts. The lotion is applied hot twice a day. He does not use soap during the winter, but cleanses his skin with the glycerin mixture. The skin is not to be dried with a towel after using the mixture.*

Reply.—The cause of winter itch is dry air. The remedy is humidifying the air of houses and offices. Awaiting the time when the underlying condition shall be remedied it is well to use this or some other palliative.

CHAPTER LXII

Garbage

HOW TO DISPOSE OF GARBAGE

The least important part of the garbage problem is garbage disposal; yet it is the part on which most thought has been put. Aside from the financial end of the question nobody is interested much in garbage disposal except the people who live near the locations where the garbage is disposed of.

They sometimes object to being made a dumping ground for the balance of the community. They say it ruins the value of their property; that it breeds flies; that it causes foul odors; and that it raises their sickness rates. They work themselves into hysterics. To them garbage disposal

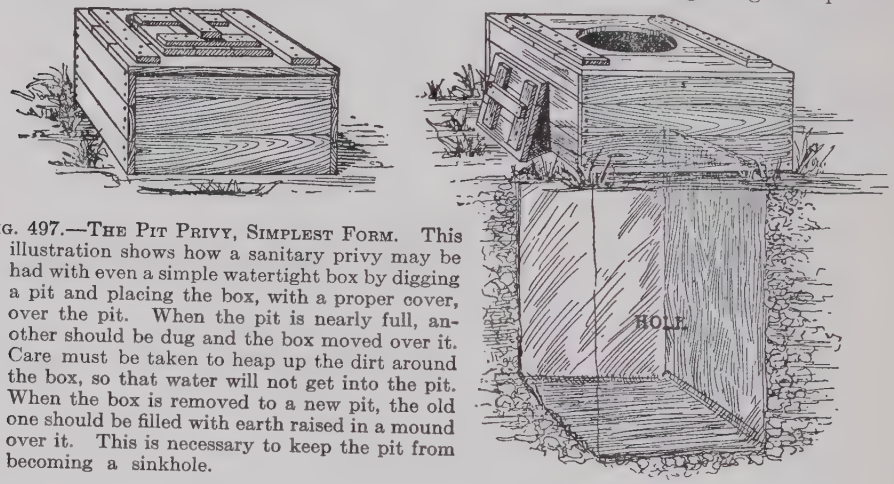


FIG. 497.—THE PIT PRIVY, SIMPLEST FORM. This illustration shows how a sanitary privy may be had with even a simple watertight box by digging a pit and placing the box, with a proper cover, over the pit. When the pit is nearly full, another should be dug and the box moved over it. Care must be taken to heap up the dirt around the box, so that water will not get into the pit. When the box is removed to a new pit, the old one should be filled with earth raised in a mound over it. This is necessary to keep the pit from becoming a sinkhole.

Virginia Health News.

has a vital interest. To the balance of the community it has only a financial interest.

Six methods of garbage disposal are made use of:

1. Garbage dumps are the least to be commended and at the same time are the most frequently made use of. There is some advantage in filling in low places. Sometimes such places become pools of water. In such pools mosquitoes may breed and children may drown. There is a wee bit of (usually far-fetched) argument in favor of filling in such low places. But they can be filled in with household rubbish and, particularly, with ashes, cinders, sweepings and excavation dirt with economy and advantage and no harm will result from such procedure.

A scientific study of levels and the use of city wastes other than wet garbage in relation thereto would be well worth the while of any community. A city could save millions by buying up gullies, clayholes and marshes and offering builders, rubbish collectors, and producers of ashes free use of such spaces for dumping purposes—and make millions thereby. Boston has tried it; Cleveland has made gullies and "washes" into school sites and hospital grounds to great advantage.

On the other hand, garbage dumps are always fringed by a half-mile or more of territory in which the baby death rate is scandalously high. Garbage dumps seem somehow to breed scandals of as many hues as Joseph's coat. Graft is thick in, on and around them. They are about as harmful as graft breeders as they are as fly breeders.

The men who advocate garbage dumps say that flies can be kept down with antiseptics and black dirt. It has been proved that fly larvae, hatching out under six feet of black dirt, will burrow to the surface. The layer of black dirt or sand over garbage is never more than a few inches thick.

The fly killers and fly repellents used on garbage dumps are ineffective. Even if results could be accomplished with these chemicals the amount which would have to be used would make the cost prohibitive.

Why speculate? The swarms of flies that hover around and are disseminated from dumps constitute the best possible evidence that dumps are fly breeders. The odor from a dump is of no health consequence. There is nothing to be said in favor of garbage dumps that would appeal to any thinking person.

DUMPS

However, I know of no American city without dumps. Some have fairly well kept dumps and of others the less said the less abusive one is. A dump, to be an unmixed blessing, must receive nothing except excavation material, wrecking material and ashes. Such dumps secure drainage, banish mosquitoes, and improve appearances.

Dumps that receive street sweepings are moderate fly breeders. Street sweepings have a fair fertilizer value, and it is wasteful as well as insanitary to put this material on dumps.

Rubbish dumps are generally fly propagators. In the miscellaneous material which goes on them there is much fly food. Cans are always present. A colony of flies can live a week on the sirup or salmon left in an empty can. Scraps of bread and other food remnants are certain to find their way into the rubbish.

On the other hand, flies can only travel a block or two and not so far as that, except as the wind blows them. Food probably never draws them more than 400 feet.

Therefore, a well kept rubbish dump will furnish a moderate excess of flies to the neighboring houses but it will never people them with swarms of flies as will a garbage or a manure dump.

Rubbish dumps cannot be treated with crude oil as a fly repellent. As it is, they are afire a good part of the time. If they were oiled they would be a neighborhood menace. To treat them with a copperas solution (two pounds of iron sulphate to a gallon of water) might be feasible but I doubt it.

Probably fifty gallons to each ton would be required and that quantity would be prohibitive. To cover with ashes and excavation material would be the best plan.

Fly larvae will burrow through several feet of soil to escape but that does not greatly concern us in dealing with rubbish dumps. They feed flies; they do not breed them; that is, not in quantities. Flies will not go through ashes or dirt to feed. A few inches of covering will suffice to keep a rubbish dump in order.

The great trouble comes from dumps that get store refuse, saloon sweepings and kitchen waste. Around such dumps flies swarm.

The walls in the neighboring homes are black with flies. The cars on the neighboring lines fill up with flies as they pass along the street. The garbage wagons drive away from the dumps carrying loads of flies.

The near-by children comb the field looking for food. Some of this is for chickens, ducks and pigs, some of it is for human use. Around the dumps two death rates are always high—summer complaint and typhoid. Such dumps should not exist at all.

Clean-up Day, to have a punch to it, must include plans for the dumps. If a plan for keeping the dumps right could be offered, pushed and adopted in clean-up week it would be enough of itself to make the week worth while.

GARBAGE REDUCTION

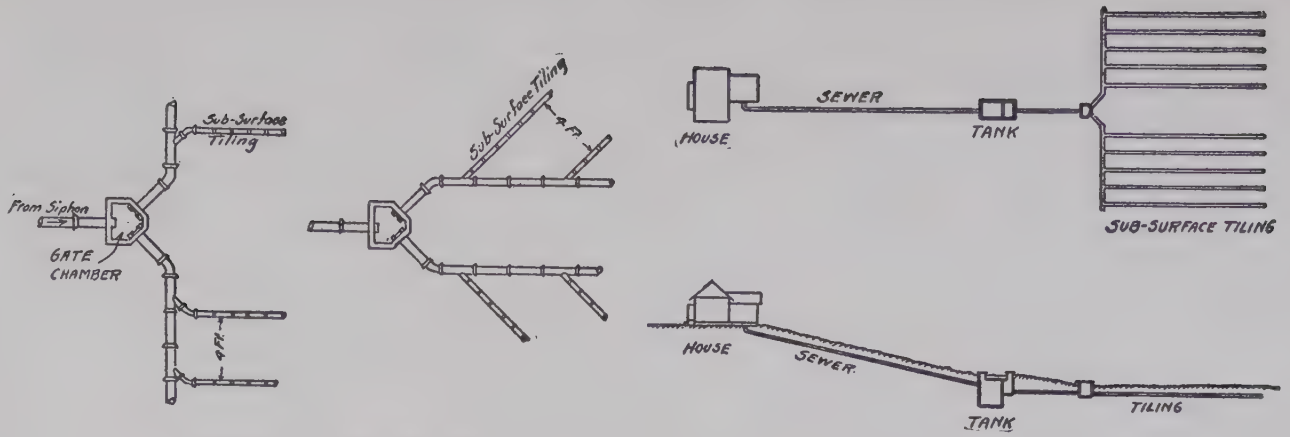
The idea prevails generally that when garbage is sorted over the articles recovered will be of great value. As a matter of fact, the picking over of rubbish scarcely pays the expense of picking even with the market of a large city at hand and where use is made of the cheapest labor. The picking over of garbage does not pay. Bones and cans are the only two objects it pays to go after.

2. The use of the reduction method requires that garbage be kept separate. It generally means a long haul. The pure garbage is more offensive than the mixtures commonly disposed of by the destructor method. This method can make use of old and stale garbage. Pig feeding requires fresh garbage and thus, indirectly, a frequent collection is promoted. Garbage reduction can make use of stale garbage, and thus, indirectly, infrequent garbage service is promoted.

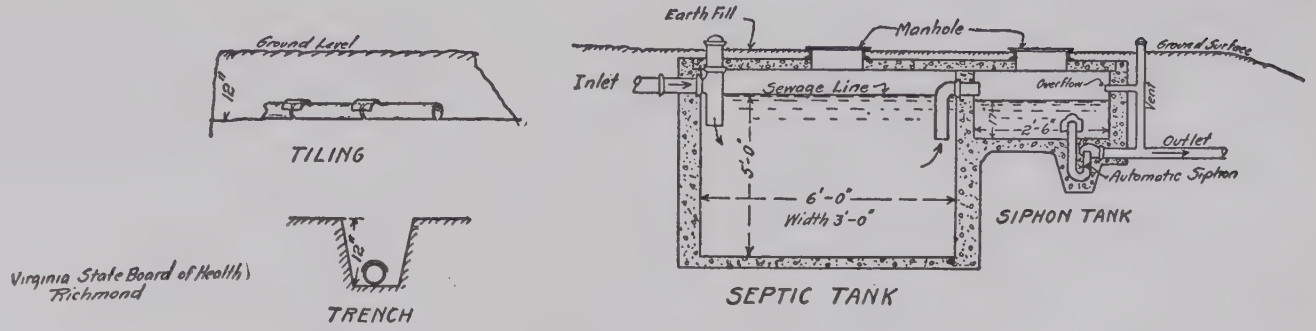
Those are the only disadvantages of the method. It can be operated without odor and without nuisance. The soluble odorous gases can be washed out of the smoke and those that are insoluble can be burned. Its great advantage is that next to the pig feeding method it is the most economical.

The greatest value in garbage is its food value. That value is abstracted by pig feeding. The next greatest value is the fat and fertilizer value. That value is abstracted by reduction. In the reduction method the garbage is roasted to drive off the water. The fat is then extracted by percolation with naphtha and the residue is dried and ground into fertilizer stock. The grease is sold for soap and allied purposes and the fertilizer stock is mixed with chemicals to make different brands of commercial fertilizer.

The Columbus, Ohio, plant clears 54 cents a ton above all operation cost,



TWO METHODS OF LAYING SUB-SURFACE TILING



Virginia State Board of Health
Richmond

SEWAGE DISPOSAL PLANT FOR PRIVATE HOME

FIG. 498.

5 cents depreciation, and 4 per cent interest on the money invested. The cost of collection is $2.10 a ton. The 54 cents earning of the disposal plant therefore reduces the cost of collection to $1.56 a ton to the taxpayers.

Changes have been suggested which would quadruple the net earnings on the disposal plant. In other words, the disposal plant should make enough on what it sells to pay for the total cost of collection.

The plant at Cleveland is of an old design, never of the best type and unduly costly to maintain, yet it always earns a goodly sum to pay on the cost of collection and occasionally for short periods the earnings are great enough to pay the entire cost of collection.

As no city has enough money, as the complaints of poor garbage collection service are constantly met with the plea that there is not money enough, no city of large size is justified in foregoing the profits from garbage reduction. However, a garbage reduction plant is expensive to build. It has seemed to me that somewhere around 150,000 inhabitants is the proper dividing line. A city over that size can afford to, and should, build a garbage reduction works. Below that and say down to 25,000 a garbage destructor is proper and below 25,000 a garbage crematory. Of course, these lines are suggestive only.

BURNING GARBAGE

3. Garbage is without value as fuel—which does not mean that burning garbage is not a good way to dispose of it. Burning destroys garbage in an inoffensive manner and that is worth paying something for. Just how inoffensive is this method depends upon how the garbage is handled before it is thrown in the fire and how hot the fire is. Of these two factors the first is much the more important.

Technically, this way of destroying garbage is divided into two methods—cremation, or burning at a temperature of less than 1,200°, and destruction, or burning at a temperature of over 1,200°.

Garbage quite well drained out will just about burn itself—that is, theoretically it will. Practically, some sort of fuel must be added. If the garbage is cremated somewhere about 300 to 400 pounds of coal is required to burn each ton.

Sometimes the garbage is cremated on the premises in household crematories. In these the temperature of the firebox is less than 1,000°. In consequence, the smoke smells. As the amount of garbage burned is small, however, there is seldom complaint of odors. Also, because not much garbage is consumed, but especially because of the freshness of it, there is little or no complaint of odors from the garbage on the way to the furnace.

The only objection to this method—and it is a valid one—is that garbage disposal in a city can never be an individual matter with any safety and comfort; and if the community is going to dispose of some of its garbage it has the right to have it all. To allow individuals to hold out their grease or garbage for any special reasons puts too heavy a burden on the taxpayers. The courts have held that if the municipality is forced to take the lean it is entitled to take the fat.

Where a crematory is owned by the municipality sometimes there is complaint of odors when the process is cremation. At temperatures of less

than 1,200° some of the garbage gases go off unburned. A low temperature crematory is less expensive to build than a high temperature destructor.

If a community is not large and not rich it will be better for it to save money by building a crematory, finding for it an isolated location.

4. Garbage destructors burn garbage at a temperature of 1,600° and over. If a good deal of rubbish and manure is mixed with the garbage they require little or no coal.

Garbage can be destroyed in a good destructor at about 30 cents a ton. The municipality owning a destructor must figure the per ton cost of collection and then add to it about 30 cents for disposal.

On the other hand, the neighbors do not complain of garbage destructors. The smoke is not offensive. The mixed garbage and rubbish en route to the destructor are not so offensive as straight garbage.

GARBAGE ON THE SOIL

5. This method of garbage disposal is made use of frequently but only because the authorities do not know what to do and usually do not know how to go about finding out. Generally speaking, this method develops as part of a contract system and is not community work. In such towns there are garbage collectors who charge from a quarter to a dollar a month to gather and dispose of the garbage of a resident. When asked what they do with the garbage they reply that they plow it into the ground. Sometimes they do; more frequently they put it on dumps. I never have heard of a contractor burning this garbage.

There is an idea that garbage has fertilizer value. As raw garbage this waste harms the soil far more than it helps even when the soil needs many of the chemicals contained in the garbage. It sours the soil.

Certainly there is never enough fertilizer value in it to pay for the expense of scattering and plowing in the garbage. Plowing will not cover it deep enough to prevent the fly larvae, with which garbage abounds, from burrowing to the surface.

On top of the inefficiency of this method is the fearful expensiveness of it. When what is paid for garbage collection by a householder during the year is compared with his taxes he finds that garbage is costing him about as much as he is paying for fire, police and health protection together and maybe more. The method has nothing to commend it.

FEEDING TO HOGS

6. *The food value of garbage is much its greatest value. The only way devised in this country to get the food value from garbage is by hog feeding.*

In Denver, Colorado, the profit from the hog feeding pays the cost of both collection and disposal. In Worcester, Massachusetts, it has occasionally done even better than that.

In some cities the city pays the expense of collection and of the wagon haul, but the contractor pays the expense of the railroad haul. Thus we see that the financial advantage of disposal by hog feeding is great.

The objections urged are that the hog pens are offensive and breed flies; that the hogs are sickly and may contract cholera and tuberculosis. Both cholera and tuberculous hogs are prone to find their way to market.

Many places now require that the garbage be cooked before being fed. This has always caused the tuberculosis rate to drop, as shown by the government records. Cholera is successfully prevented by vaccination.

The pens usually are a nuisance. A careful and cleanly contractor will prevent this. Many will not.

Land isolated enough for hog feeding yet accessible to the city is hard to find. I expect to see the faults of hog feeding corrected and that method of garbage disposal grow. There are communities to which it is well adapted.

ST. JOSEPH'S GARBAGE REPORT

St. Joseph, Missouri, followed the plan of dumping its waste in the Missouri River from its village days until the time when it was stopped by the United States government. It then appointed a commission to study the subject of waste disposal. The recommendations of that commission were:

1. That the municipal collection of all wastes be established.
2. That vaults in sewer districts be abolished.
3. That stable manure be collected and sold.
4. That the reduction of garbage at a profit in St. Joseph is impracticable.
5. That an effort be made to coöperate with neighboring cities in the building and maintenance of refuse disposal works but in event of the failure of this effort that St. Joseph's garbage be burned in a destructor.
6. That a tract of land be purchased for the installation of municipal utilities.

Scores of American cities have appointed commissions on refuse disposal. Some of these have been most thorough and scientific; others have not gone into the subject deeply.

Milwaukee, appreciating the variation in the wastes of cities by reason of variation in the manufactures as well as variation in domestic customs, included in its report the results of a scientific investigation into the values of its wastes.

In the Boston report there is an analysis of the wastes of that city from which we learn that, expressing the tonnage of market refuse by 1, the tonnage of rubbish would be 1.5, of garbage 8.5 and of ashes 33.3.

There are so many of these reports now in hand that there is not much need of visiting commissions or testimony taking bodies. Any commissioner of public works can analyze these data and use them as a basis for an opinion as to what is best for his community.

Practically every commission has reported that the municipality should collect all of the refuse. The Boston report recommends that the community collect the refuse but that a charge be made for collecting the refuse from certain groups. The recommendation relative to stable manure is a good one founded on good economic principles as well as on good sanitary principles, yet I know of no community that has carried it out.

Coöperative treatment of refuse by cities adjacent to each other has

not been carried out in this country. In view of the great economic advantages of reduction and the further fact that the first cost of reduction works puts that method beyond the reach of small communities the suggestion of coöperative effort is well worth while. Failing in efforts to coöperate the decision to burn was proper.

The fourth point decided suggests the advisability of cities' providing land funds, as German cities have done, and using those funds to purchase lands at bargains and then holding them for garbage disposal and other uses.

STABLE MANURE

We cannot think of cleaning up without talking about the manure box. It would be like the small boy washing his face and leaving a dirt line—dirty ears and neck.

Paper in the alley is as nothing compared with the manure box. It's the fly that the whole thing hinges on. The cleaning is to be measured in flies. Flies breed in stable manure. They breed elsewhere, it is true, but the breeding place de luxe *is the manure box. Then let the city cleaning plan include the manure box.*

Flies pass through the egg stage and the larva stage to the fly stage in ten days in hot weather. In cold weather it may require three weeks, which means that the manure box which is emptied every week in hot weather and every two weeks in cooler weather does not do much harm.

The top three feet at least should be emptied. It is in that area that the eggs and larvae will be.

If the box has a fly hole anywhere on the side all the manure for a foot or more around must be emptied. Practically, this means that the manure box must be made flyproof with a fly screen and that the whole contents must be emptied weekly from May until November.

Forbes of the University of Illinois says that flies will not breed in manure if it is treated every day with a sulphate of iron spray. He recommends that a solution be made by dissolving two pounds of the iron in a gallon of water and using that amount for each horse each day.

Old-fashioned lime does no good at all as a repellent. Chlorid of lime or chlorinated lime Howard recommended several years ago; but I think he has lost faith in it in recent years.

A few years ago the Jacksonville, Florida, authorities found the ground in dirt floor stables teeming with fly eggs and fly larvae. It was their conclusion that a dirt floor stable was always a fly breeder. So our city cleaning friends might well look after the stable floors.

They must not get the idea that automobiles have driven horses out of town. There are nearly 100,000 horses in Chicago and the majority of them are stabled in the most densely populated part of the city.

The street sweepings while on the street and also while in the sidewalk boxes are not fly breeders. They are knocked around too much to appeal to Madam Fly. Rather is the fly in search of the more quiet, more secluded alley boxes.

It will do but little good to have these boxes emptied during clean-up

week and left overflowing and uncovered during the weeks that follow. Cleaning up includes the plans and equipment necessary to keep clean.

Disposal of Garbage.—*E. H. L. (Colorado) writes: "Kindly tell me an effective but simple sanitary way to dispose of garbage in the country."*

REPLY.—Garbage can be fed to hogs and chickens and this is a good method, especially in Colorado. If this method is not available or feasible, domestic garbage can be buried. It can be burned in a crematory built of stones after the fashion called "kitchen sink crematories" in the United States army. This is a small pit lined with stones, deeper at one end than at the other, and with a central pile of loose stones reaching higher than the level of the pit. A wood fire is built in the pit. After the stones are heated through, the garbage is fed to the fire at a moderate rate.

Burning Out Garbage Cans.—*V. E. M. writes: "Here is a practical suggestion about garbage cans which you may think useful: We have a sheet iron can, and even after it is emptied it is a great breeding place of flies, etc. I put in a few newspapers and set them afire. The heat destroys germ life and leaves nothing but a few ashes, and it is more effective and less expensive than scalding or the use of disinfectants. Of course one must watch it for a few minutes to prevent the spreading of fire."*

REPLY.—The suggestion contained in this letter should have a wide circulation. Offensive cans can be made inoffensive and sterile by burning them out. Where it is allowable to wrap the garbage in paper this is not necessary.

Burning Leaves.—*G. R. J. writes: "Please tell whether or not the practice of disposing of fallen leaves in the autumn by piling and burning them in the streets tends to spread such contagious diseases as diphtheria, etc."*

REPLY.—No.

Danger Has Passed.—*E. S. writes: "A privy vault, used by a family of five or six persons for three years, was covered with five feet of dirt fourteen years ago. If ever there was any danger to the occupants of the house that was built over it, has that danger passed?"*

REPLY.—Yes.

Garbage as Compost.—*B. J. A. writes: "I reserve space in the garden about 6' x 12', on which I dump the lawn mowings and vegetable tops, leaves, and the like. The garbage is dumped, and lawn grass and the like is put on the top of it, but not sufficiently thick to keep the air from reaching it, and the result is that the garbage nitrifies but does not to any extent putrefy. Flies when feeding do not dig down into dark places, and I have noted that, even when you can almost see through the covering of the garbage, flies are slow to enter this opening to feed. In the fall I dig this garbage pile and pulverize the contents. Such as does not pulverize I fork over and use to start another pile in some other place, so that the leachings from it are at a different place in the garden during each year. People look at me in astonishment when I show them this sanitary garbage heap."*

REPLY.—This method is worth trying in towns and villages without proper garbage disposal. If, however, all premises were clean and the flies were put to it for refuse they would go down into these piles.

CHAPTER LXIII

Insurance

EFFECT OF HEALTH INSURANCE

Recent figures show a remarkable improvement in German health conditions. The number of deaths from diphtheria was 54,760 in 1893 whereas from 1912 to 1916 no yearly total has been as high as 10,000. Typhoid has fallen from 18,756 in 1875 to 2,000. The tuberculosis rate is just one-half what it was thirty years ago.

The death rate of children under one year of age, in German cities, is about one-half what it was ten years ago. For instance, of 100 babies born, the number of deaths at less than one year of age was in Darmstadt in 1903, 17.4; in 1910, 9.2; in Dresden in 1903, 19.2; in 1910, 12.8; in Elberfeld, in 1903, 16.9; in 1910, 9.

These improvements are the result of health activities, the most comprehensive of which was the Bismarck health insurance bill made operative in 1892.

The English death rates also have shown great decrease, though not so great as Germany's. London seems permanently intrenched in its position as the city with the lowest death rate among large cities. As the result of the operation of the insurance bill which became effective a few years ago, London should make an equally satisfactory showing by 1917.

These reduced death rates, reduced sickness rates and the economic changes with which they are associated are bearing down hard on the practice of healing. When there are not so many to be healed there is not so much for the healer. In this country all of the Christian Scientists, osteopaths and chiropractors, about half of the homeopaths and eclectics and a respectable minority of the so-called regulars are practically always found opposed to health legislation.

In Great Britain the British Medical Association has indorsed the national insurance bill but it is contending for more remuneration for services. Its members do not believe they should give a man medical service for a year for $1.50. Among the matters to be discussed by the forthcoming meeting of the British Medical Association are better remuneration for physicians in connection with school inspection, care of children, dental work, hospital and dispensary work, consumption and maternity service.

There is no doubt that the people have the right to health and efficiency. They will always approve measures which bring about these ends. When once the people are informed, such issues make the finest of platforms for political parties—platforms on which statesmen and politicians can stand to advantage with the people.

It is unfortunate that some divisions of healing find it necessary to oppose this work. A wiser policy for them would be to back up the proposals but to ask for living conditions under their operation—wiser for them and wiser for the people. On this point Lloyd-George said: "Sweated labor is the worst labor in the world. If you want to get the best out of a man you must pay him a wage which satisfies his reasonable demands. Improve the condition of the doctors and you improve the general health of the country." This is the present attitude of the American Medical Association and, I think, will eventually be the attitude of the homeopathic and eclectic professions.

SOCIAL INSURANCE

The gradual evolution of social insurance is one of the themes of a work by Dawson on "Social Insurance in Germany." In that country, as everywhere else, governmental activities are foreshadowed by the activities of men acting in groups. In Germany the direct forerunners of the insurance laws were workingmen's unions paying sickness and disability benefits. In 1854 the Diet passed laws which strengthened these societies and increased their efficiency. One of these laws gave cities the right to pass ordinances requiring people to join benefit societies.

In 1882 Bismarck forced the passage of a scheme of obligatory sickness insurance. In arguing for the measure he said:

"It is the tradition of the dynasty which I serve that it takes the part of the weaker ones in the economic struggle."

The first law passed in Germany does not bear much resemblance to the law as it stands now. Just as the law itself evolved out of the benefit features of the unions so the law changes as experience demonstrates the wisdom of change.

In many of its provisions the German law is not the equal of the English law. There is a provision of the English law that if a town neglects its sanitation and in consequence has a high sickness rate the extra cost is assessed against the taxable property of the town.

Another provision is that if there is a great deal of sickness among the workers in a factory and if it is found the factory is not kept in a sanitary condition the extra expense of insurance must be borne by the owner of the factory.

There is great agitation in Germany now to use some of the features embodied in the English law. Especially are they trying to vary the contributions to the insurance fund according to the degree of healthfulness of different occupations. It is their contention that the insurance rate for the brass industry should be higher than that for some industry that has little tendency to disable men. The extra expense should be divided, in their judgment, between the employer, the employee and the state, as the manufacture of brass is a community necessity and therefore a community hazard and expense.

Discussions of questions of this type in bringing about the end sought are also incidentally of great service in popularizing information as to the effects of different occupations on health and efficiency.

INDUSTRIAL INSURANCE

In England the cost of insurance is divided between the employee, the employer and the government. In Germany the cost is borne by the employee and employer, the government contributing nothing. As the English system was not adopted until the German had been working for twenty years naturally it is an improvement, at least in many particulars, over the plan which pioneered.

In Germany insurance against illness and dependence in old age is charged for on the basis of wages. Accident insurance is on a mutual basis and varies from year to year.

The division of cost of sickness and invalidism is divided between employer and employee on the basis of about 6 to 10. A workingman getting $7.50 a week pays 21 cents for insurance and his employer pays 13 cents. For sickness insurance the employee pays about 2.3 per cent of his wages and the employer 1.7 per cent. The cost for insurance to provide for old age and invalidism is about 1 per cent of wages. The cost of this last type of insurance is divided equally between employee and employer.

For this the service rendered is of many sorts. These health activities are well worthy of note.

Up to the end of 1910 the amount that had been devoted to the building of sanitary homes to replace tenements and shacks was $75,000,000. Nearly $5,000,000 had been spent in building quarters for single persons; for buildings for the indirect conservation of public health, $38,000,000; education of the public in public and personal hygiene, $20,000,000.

In many places these funds have established recuperation or convalescent homes. Since 1899 much energy has been exerted in establishing forest resorts. At the present time there are more than one hundred of these. The better known are those near Berlin, Dusseldorf, Munich, Dresden, Leipzig, Cassel, Carlsruhe, Frankfort and Hanover. These resorts are made as inexpensive as possible. The buildings are cheap wooden shacks with shelter benches, chairs and hammocks. A lunch counter serving bread and milk is provided. Generally, the forest resorts are within seven miles of the city on lines of easy communication, and the invalids are expected to reach them in the early morning and to leave for home by night.

They take care of people with weak nerves, asthma, anemia, mild heart disease and convalescents generally—"those persons in indifferent health who need to rest and recuperate in the open air."

Charlottenburg maintains what is known as a Holiday Colony for children.

Much of the activities of the boards is directed toward the lowering of infant mortality. Dawson says the central idea coming to be seen, or seen with increasing clearness, is that men value fair and full use of their faculties more highly than distress benefits. They want healthy life, sound limbs and unimpaired energies, not accident compensation; opportunity and power to work, not infirmity pensions.

CHAPTER LXIV

Hospitals—Schools

VALUE OF THE HOSPITAL

The usefulness of the hospital in this country is not generally understood or appreciated. For one reason or another there seems to be an unwarranted prejudice entertained against it by a large percentage of our people. This in some measure is due to ignorance of its functions.

There has also been coupled with the name "hospital" in this country a feeling of dislike superinduced, no doubt, by superstition. In other words, when you say the word "hospital" to a number of people "like a duck in thunder" they seem to lose their mental bearings.

Let it be said (and to the credit of our people, too) that this dislike for hospitals is being rapidly and fortunately overcome.

Both the doctor and the layman are beginning to realize that the proper place in which to carry on the fight against the ravages of disease and to lessen human suffering is in the hospital. It is in the hospital that the medical man and the surgeon can do the most effective work in their efforts to elucidate the cause of disease, to discover methods for preventing disease and to apply most scientifically remedies and surgical measures for curing disease and repairing fractures.

"The rôle which the modern hospital plays in the education not only of the medical profession but also of the public in general is far reaching and its scope is practically unlimited. The abundance of clinical material which comes under the eye of the physician or surgeon is important in increasing his knowledge of diseases and their treatment."

The functions of the hospital, however, are not limited to the mere caring for the sick and the injured. The hospital is the center of genuine scientific medical and surgical work.

Here the latest and most improved methods of caring for the sick and the injured are employed. Here the nurse receives her education in how to conduct a campaign in favor of public health. Here the sanitary engineer goes to get points on how to build and operate public institutions. Here the sanitary physician receives his training in how to prevent the spread of diseases, especially those communicable.

Here you find the bacteriologist, the chemist, the scientist, actively at work furnishing special knowledge to the statistician as a basis from which he makes up his calculations. Here is the headquarters for that large body of doctors and nurses who compose our sanitary educators and who go about disseminating knowledge of the way disease spreads and the ways in which it is prevented.

This body of missionaries of sanitation constitutes, in my judgment, the most important army of men and women engaged in the modern movement for the conservation of public health. In the campaign against contagious and infectious diseases, particularly tuberculosis, they have disseminated much knowledge concerning the importance of personal hygiene and practical methods of sanitation.

The anti-tuberculosis movement brought the knowledge of how to fight this particular microbe into the home of the individual. Knowledge of the sanitary disposition of the sputum, of how to make tenements and shops hygienic and of what constituted healthy habits of the individual were taught to each member of the home.

The people were taught that the success of the fight against the great white plague was an individual fight and that the duty of each individual was so to shape his life and habits as not to affect his friends and neighbors.

The credit for setting in motion the machinery which has so successfully carried this knowledge of hygiene and sanitation into the home of the individual is largely due to the hospital.

It must not be forgotten that these results were not accomplished by merely disseminating information through lecture bureaus, pamphlets and general instruction.

These doctors and nurses—missionaries—went personally into the field of work and personally taught sanitation and hygiene.

What they have done to educate people concerning the cause and cure of tuberculosis they have done equally as effectively regarding the cause and cure of other contagious diseases. Of them Bishop Spaulding would say:

"They are true physicians, waiting upon the miseries of man; like sentinels, at their posts they stand, ever ready to bring relief. Neither darkness of night, nor storm, nor contagion, nor pestilence, nor the field of carnage can deter them when duty calls."

It is through this personal work that much of the information used for making up the vital statistics record, particularly among children, has been secured.

For some reason or other a fallacy has obtained among the doctors as well as the laity that the hospital is only for surgical and operative cases. This, however, is not true. On the other hand, the hospital is the safe place for a case of typhoid, pneumonia, appendicitis, peritonitis—in fact, any illness of sufficient seriousness to require daily visits by the physician and an attending nurse or where much nursing or attention is required on the part of members of the family or friends.

Here you find system and regularity in the care of the sufferer and, should an emergency arise requiring the hasty intervention of surgical procedures to foil death, much time can be saved.

The time element with reference to the conditions when the operation is done is also a determining factor when we come to make up the prognosis of the case.

No doubt many a life could have been saved by quick surgical procedures when an operable case reached the crisis had the case been where the operation could have been performed.

Many surgeons of renown hesitate when asked to operate under the handicap of ill prepared surroundings.

To operate in a strange place with strange help is unfair to the patient and to the surgeon. His mind should be free to concentrate on what his eye is seeing, his fingers are feeling and his knife is cutting.

He cannot divide his thought and be just to the patient; and even with the best of oversight strange attendants and strange surroundings not infrequently mean a break in surgical cleanliness—a chain as weak as its weakest link.

When sick and in the hospital you are reasonably sure of being efficiently cared for. In the hospital a chart is kept by the attending nurse so that each time the doctor makes a visit he has but to glance over this chart in order to know how his patient has progressed, in order to know the condition of his patient.

There is then little for the doctor to do save to look at his charts, occasionally attend dressings (when the case happens to be a surgical one), and direct the nurse as to the further care of his patient.

The patient feels more at ease realizing that he is not a burden to family and friends and that every attention possible will be accorded him tending to make him comfortable and well.

The family, knowing that the sick one will be properly cared for, that it can hear from him at almost any hour of the day or night, soon becomes reconciled to this condition and is far better off, being relieved of the burden of care which would otherwise have been imposed and being better able to attend to its daily duties.

WHO SHOULD GO TO A HOSPITAL

Shall an expectant mother go to the hospital? Yes. Health department reports show that about one-thirtieth of the babies born die during the first twenty-four hours of birth. The death rate during the first week is very high. The newly born babe has but a feeble hold on life and little, seemingly unimportant influences may decide whether the baby will live or not. The infection of the baby's eyes which ends in blindness starts suddenly and progresses rapidly. The chance of saving sight is greater in the hospital than outside.

When it comes to the mother, the death and accident rate among mothers is much less in a hospital than outside. There is less infection, less childbed fever and less danger from hemorrhage. The risk in every direction is less.

When we consider the trouble in the home, the advantage is on the side of having the mother go to the hospital. The household is spared disarrangement. One reason for the growth in midwife confinement is the matter of household necessities. When a woman of small means is confined in her home by a physician, provision must be made for the physician, the nurse, and a servant to help out. When the service is rendered by a midwife, the doctor, the nurse and the servant are all rolled into one. In my judgment, the household service advantage is the largest factor in the growing use of midwives. The cure for the situation—and the high death and accident rates demand a remedy—is enough hospitals and dispensaries to care for the maternity cases. And finally, it will be found that a case of confinement costs less in the hospital than at home.

Shall consumption be cared for in a hospital? Yes. The chance of getting well is very much better in a hospital than outside. A man who learns that he has consumption will improve his chances materially if he will go at once to a sanitarium. He will get rest and an environment which makes against worry in contrast with his home where things make for worry. He will be fed right. He will get air. He will learn how to take care of himself and others. Learning by doing is better than learning by listening. If his disease is not progressive in type he may be able to finish his cure at home.

Every case of advanced tuberculosis should be in a hospital. They are safer and happier there. Their chance of cure is greater there than outside. An advanced consumptive kept at home is certain to infect half of his immediate family, although many of them may cure their infection after a short "run down" period.

Should a case of typhoid fever go to the hospital? Yes. The death rate from typhoid fever in hospitals is lower than outside. In an ordinary epidemic out of each one hundred cases treated outside hospitals, ninety get well. Out of a similar number treated in hospitals ninety-four will get well—a difference worth considering.

Aside from the influence on a man's chance of recovery is the question of protecting the community. Typhoid cases cared for by nurses in fly-screened houses where there are good toilet facilities do not endanger anybody. Unless these conditions are met there is a moderate amount of danger. If there is no regard whatsoever for sanitary law there is great danger.

Shall teething babies be cared for in hospitals? No. This answer requires some modification. If the choice is between a very poor home and a hospital the answer should be—Yes. If the mother can go to the hospital and breast-feed her baby—Yes. If the wards are refrigerated so that the temperature is kept below 75°, if the windows are screened and if the milk is given to the babies from cows on the premises or if it is received at the hospital in less than twelve hours after it has been milked and used in less than twenty-four hours—Yes.

In between these extremes there are the cases that are to be decided after weighing the sanitary virtues of the hospital and the sanitary vices of the home—each case to be decided individually. The hospital baby death rate is very high. In the old-style hospital it was nearly 100 per cent. The more modern ones are showing lower death rates but their rates are still above those of babies in reasonably good homes.

Shall ordinary illness be cared for in a hospital? Yes. The home is for the well. The hospital is for the sick. The home is planned to care for a well man with a high degree of efficiency. When it comes to caring for sick men its efficiency is low. If a home can care for a sick man efficiently then certainly there is great waste in its care of the well. A home that has a great excess of room, of space, of everything, can care for a sick man—not well but passably well. But see the habitual waste of such a place.

The chance of recovery in a home is less than in a hospital. If the illness is mild and recovery is certain this does not make much difference. The sick one is disturbed more by worry, noise and domestic disarrangement; but no vital harm is done. If the illness is violent and life hangs in the balance the advantage of the hospital over the home may be enough to determine the issue.

In our thought of the sick member we must not overlook the well. The breadwinners can stand the extra strain much better when the sick one is in a hospital. It is presumed the home is what it ought to be in this phase at least—the place where the workers-out can be at ease to recuperate from the burden of one day and to prepare for the trials of the next. Usually illness places an extra strain on the workers-out and the mother in charge of the house. Generally it is poor judgment to load them with this extra strain, especially as the alternative—hospital care—gives the sick person greater comfort and a better chance of recovery.

The above is the sensible way to look at hospitals. Eventually it will be the way everybody will look at them—rich and poor alike. If everybody thought this way now there would not be beds enough for the sick. The percentage of beds to population will probably grow about as fast as sentiment demands. Before many years towns of 5,000 and even thickly populated rural districts will have hospitals.

CASES OF CONTAGION IN HOSPITALS

Should every case of contagion go to a hospital? To this question there is but one answer—Yes. There are certain conditions under which the need is most imperative. For instance, contagion developing in a hotel must go to a hospital, however strong is the inclination otherwise. The demand is almost as great where the case is in a flat building or in a house where several families live on the same floor or in the same building. If several families use the same toilet facilities, as is the case so frequently in poorer homes, the disease always spreads if the case is left in the home.

Certain diseases are more easily spread than others. Smallpox in a city cannot be left in the home with safety. Measles is about as certain to spread when left in the home as is smallpox. Scarlet fever and diphtheria are much less catching and frequently no spreading follows the leaving of a case in the home.

Spinal meningitis and infantile paralysis are not so dangerous but that they can be left at home during the disease; but after convalescence is established it is highly desirable to carry the patient to the hospital or convalescent home and leave him there until he is safe.

Whatever the form of contagion the sick one stands a better chance in the hospital than at home. There never was a home good enough or provided with enough nurses or enough doctors to make it as good a place to be sick in as a good hospital with the special nurses and special physicians that money can buy. When it comes to comparing a crowded home with a hospital the advantage is all on the side of the hospital. *The parent who keeps his child sick with contagion at home is not fair with his child.* He increases his chance of dying at least 10 per cent, and sometimes much more. That is a pretty big price to pay for sentiment.

Should surgical cases be cared for in a hospital? Again the answer is yes. The emphasis of the answer depends on circumstances. If the case is one where infection must be strenuously avoided the answer is emphatic. If it is one where accidents are liable to happen or emergencies to arise, emphatically yes.

If the case is one where life is to hang in the balance, where everybody must work at high efficiency or death will result, emphatically yes. Other types of cases permit more leeway. There are times when one or another consideration may make it wise to keep the patient at home. But even in these the burden of proof should be on the home.

SCHOOLS

SCHOOL EFFICIENCY EFFORT

A book well worth one's while is Miss Denison's "Health of School Children." In this book she says: "The chief reason that national and large local groups of physicians interested in school health have not been more effective is that they have not yet appreciated the value of lay coöperation."

Since the development of the public school system parents, physicians, and everybody have been disposed to unload the child on the school teacher.

FIG. 499.—TYPICAL SEWAGE DISPOSAL BY SUBSURFACE IRRIGATION.

Not only is mental training expected but physical and moral training as well. The parent has leaned on the school teacher, as everybody knows.

The physician has been even a worse offender. Nine physicians out of ten know nothing about the hygiene of the schoolroom; have given no thought to posture in relation to development or even to the spread of contagion through the schools. The physician has unloaded on the teacher.

If one reads the books (of which there is a considerable number) on the different phases of school hygiene he will note that most of them are written by teachers. The few from the pens of medical men are written by such as are not working at their trade; none of them at least is practicing curative medicine.

Now it is a fact that the physical care of the child limps along, lame and halt, while the mental care goes by leaps and bounds. The reason is a lack of public interest. As it is on the shoulders of the teachers that the burden falls Miss Denison's suggestion should have been tendered the teaching rather than the medical profession.

In addition Miss Denison estimates that the people of the United States spend $10,000,000 a year in helping out the schools. This money is put out for school lunches, school playgrounds, open-air schools and a thousand activities supplementing work done out of public funds.

For instance, business men of Columbus, Georgia, contributed $10,000 for kindergartens. A bequest of $120,000 provided Oshkosh, Wisconsin, with a manual training school. Two million dollars was bequeathed to help out the Muskegon, Michigan, schools. One thousand dollars was given to the Racine, Wisconsin, school library. The outdoor schools of Chicago are aided by the Elizabeth McCormick Memorial fund—and so on through a long list.

The style was set by Benjamin Franklin who bequeathed $500 as a fund the interest on which was to be used to help out the Boston schools.

Anyone who reads this book by Miss Denison will be astounded to know how much is being done; also to know how differently it is being done.

No two communities are doing exactly the same thing in exactly the same way. This, of course, means that things are being wastefully done.

If there were a standardized method of procedure and every town trying to do something for school hygiene would follow these standardized methods a dollar would go twice as far.

A great many million dollars have been expended on the ventilation of school buildings. This ventilation has been all right from the engineering standpoint yet all wrong from the health standpoint because the only sanitary standards for ventilation are forty years old.

A New York woman has given a sum of money to be expended in establishing sanitary standards of ventilation particularly for schools. While it will not be possible to have a report at Buffalo from the commission created for this purpose Winslow, Kimball and perhaps others of prominence are on the board and the machinery will be set going for a wide publication and acceptation of the report when it is issued.

However, this is only an illustration. Physical examination, control of contagion, school nursing, school feeding, open-air schools, cold-room schools —in each of these there is urgent need of standardization of method.

Efficiency is the talk of the day. The railroad man wants to know the efficiency of rails, tires, engines, cars—everything. The business man will take time from his business to study efficiency in salesmanship or in some other department of his business. He will employ efficiency engineers and permit them to come and go as they please through his affairs.

In fact, efficiency makes an impression on the impassive mind of the business man where sickness rates, disease rates and death rates are impotent.

It has always seemed to me that the business mind is of the show-me type and efficiency engineering from beginning to end is on a show-me plan. These other arguments are not easily reducible to the show-me basis and in consequence they do not lend themselves readily to argument for business since business is on a competitive basis.

It is not difficult to prove the loss of efficiency in school children. Children are taught in classes of about forty. Of this forty about five are so impossible that the teacher sets the pace without regard to them. At the top are about two who are rapidly passed on to higher grades.

There remain about thirty-three for whom the pace is set so that the weakest ten in the group can keep up. That means that the top fifteen could go much faster than they do; could learn much more thoroughly as well. When they are held back to the pace of the low ten they are working at low efficiency.

This condition is recognized by the teacher. She works extra hard in an effort to bring the pacemakers, the low ten, along as rapidly as possible. She is presently in a state of chronic fatigue. She works at low efficiency.

Of the millions of money spent for education much the larger part paid from current funds is for teachers' salaries. In the Hoboken budget exhibit there was a diagram showing that about 70 cents out of each dollar went for teachers' salaries.

Therefore, when teachers work at low efficiency, the taxpayer is hard hit.

The school teacher does not work at low efficiency because she wants to. Her anxiety to get results that are impossible is partly responsible for her low efficiency.

In fact, the cause is beyond her direct control. She sits at one end of the line compelled to mold minds whose incapacity for molding at an efficient rate has been determined by factors at the other end of the line. She must mold the clay as it is furnished her. Is there anything she can do?

These facts are unknown to the community in general. The fathers are too busy with their business and the mothers with their homes. Nobody has ever told the taxpayer about these wasted millions.

Nobody (speaking with as much authority as the school teacher) can tell him about the waste. She knows and the parents know she knows. They will listen to her.

As Miss Denison says, the matter will never make a public appeal until it gets away from the professional societies; until the to-be-helped rather than the helpers feel it their concern.

The child is unable to learn because of his physical condition.

He may have too much thyroid or too little, too much or too little of some other gland, or he may have bad teeth or be a mouth breather or a catcher or a snuffler—any one of these or many other conditions may be responsible for his predicament. But here lies the cause in three cases out of four. And why not?

We have known for centuries that in the years from seven to seventeen the mind must be looked after. Certain exceptional brains will travel through those years without control and direction and will acquire power as well as training. Those are the exceptions.

The average brain left undirected in those years travels toward the penitentiary or poorhouse, or into the group of untrained labor. These facts are so well established that education is compulsory.

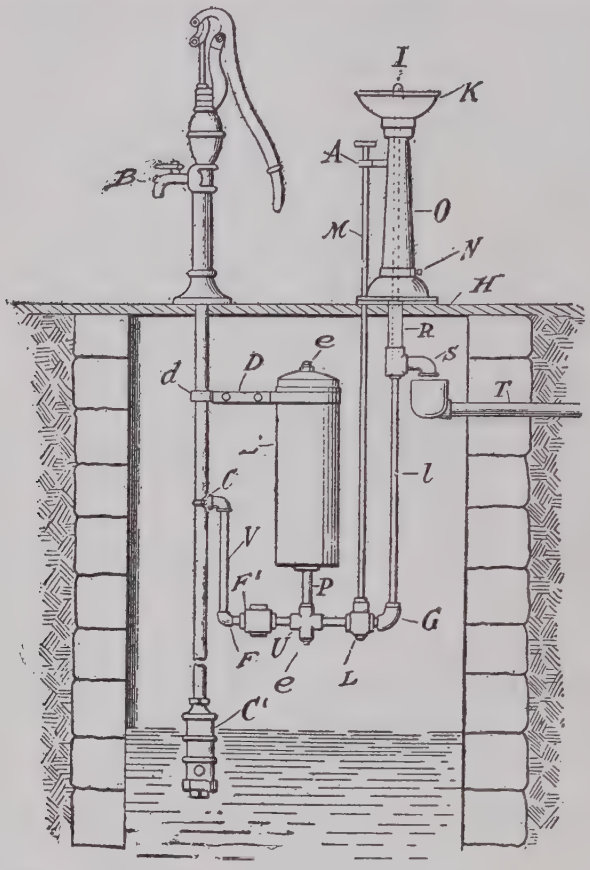
The changes in the body between seven and seventeen are as important as those in the mind. If it is necessary for the welfare of society that this enormous educational machine should be supported to train the mind is it logical that the body should be wholly uncared for? If it be argued that that can be left to the parent, the home and the child the answer is that education can be left to the same agencies.

When education is left to these groups unaided the percentage of unfit minds increases though many minds come out all right. Is it not logical to assert that when the physical side is left to the same agencies unaided the percentage of the unfit is increased, even though a great many come out all right?

Under a better system is it not probable that we shall get after a while

a better idea of what is physically right just as our present standard of a trained mind is much higher than that of half a century ago?

If the mind and the body are Siamese twins and the developed, trained



Illinois Dept. of Public Instruction.

FIG. 500.—McCABE DRINKING FOUNTAIN ATTACHED TO A PUMP.

twin is being held back by the untrained one shall we bring up the halt one or shall we lame the other one?

There is no use trying to run the halves of the machine at different speeds. Education must not go back.

The child is an egoistic parasite. The schools train him out of egoism and somewhat out of parasitism. Rubbing up against other children gives him a chance to find himself.

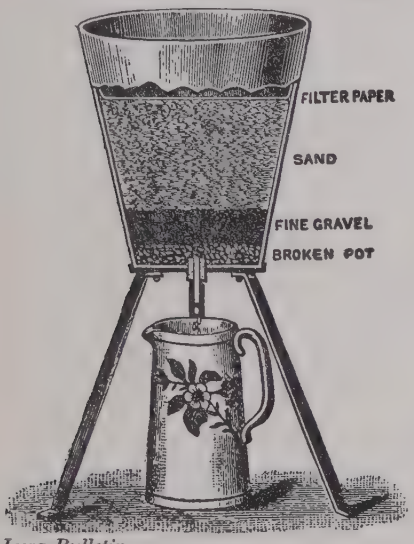
The demand for efficiency is increasing. The public schools will find that the burden put on them in the future will be much increased.

This half of the machine cannot slow down. The other half must be speeded up. That is not possible when the years from seven to seventeen are not made use of for the perfection of the machine.

The condition to which it can be brought by home and parental and in-

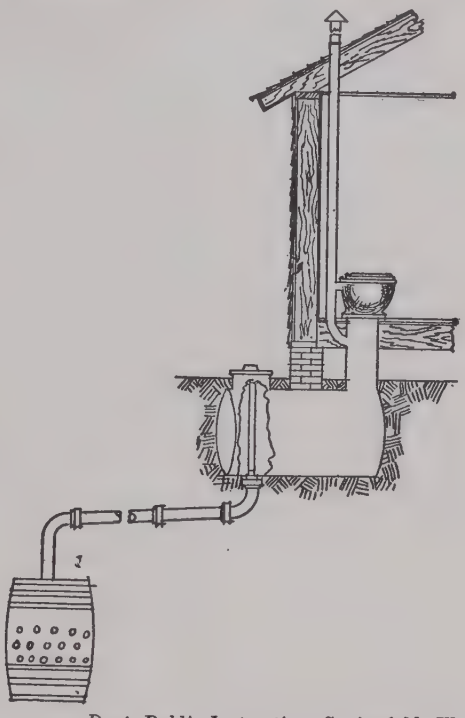
dividual care will not allow of any more speeding up. It is like trying to use at speed ball bearings where two-tenths of the balls are imperfect. It cannot be done. It is unreasonable to think that it can.

(From Water-Supplies, by Thresh)



Iowa Bulletin.

FIG. 501.—HOMEMADE FILTER FOR DOMESTIC OR SCHOOL USE.



Dept. Public Instruction, Springfield, Ill.

FIG. 502.—ANTISEPTIC TANK OR CHEMICAL SYSTEM FOR ONE-ROOM SCHOOLS.

To proceed further on our present lines does not commend itself to Yankee horse sense.

SCHOOL HYGIENE

This is what Dr. Corlin wrote the Michigan Board of Health to show what bad school conditions could do:

"Numerous hale, ruddy, little pupils, five, six, seven and eight years of age have entered with much ambition for their first school instruction. As I have had my own children among them and others to treat, I have watched the effect of their condition and surroundings and know whereof I affirm. In this building, on a small scale, I have seen Darwin's theory of the survival of the fittest tested, and its correctness demonstrated.

"Year by year, this school is constantly crowded beyond its healthful capacity, notwithstanding that the weaker ones are continuously compelled to drop from the ranks and remain at home to recruit their exhausted energies.

"A little boy who, during a period of four years, was confined in one of these rooms accomplished no more than could easily have been done in two years' time under suitable and healthful surroundings.

"Because of the vile air of this room, he was permitted by his father to attend but one and a half hours each morning and afternoon, and, even so, he could attend the school for no more than eight or nine successive weeks, because of resulting sickness, from which a few weeks' absence from school never failed to restore him.

"He was finally sent to a more distant and, from a sanitary point of view, a better school, and, in a clean, light, and airy room, where he attended regularly and without interruption, improved in physical health and accomplished much more in his studies than at any previous time."

To which Professor Woodbridge adds:

"The hardest worker in a school-room is the teacher. The character of a teacher's work is as susceptible to the debilitating and blunting effects of environment as is that of the scholar. Whatever affects the teacher's working capacity correspondingly affects the productive work of the pupils."

Compulsory education is all right. It has been upheld by the courts. It is backed by public sentiment. However, compulsory education is a misnomer. The laws should be known as compulsory attendance laws.

Education implies something more than attendance. Children who are not in good physical condition do not get much educational benefit from attendance. If the hygienic conditions are extremely bad they may be grievously harmed by compulsory attendance.

The burden put upon the teachers by bad school hygiene is great.

SCHOOLROOM VENTILATION

Schools are usually well lighted but poorly ventilated. In fact, they usually suffer from too much rather than too little light. Nor have I ever been able to see much danger from schoolroom dust. But when it comes to ventilation including regulation of temperature and moisture, conditions are bad. They are unfit for grown people to stay in, to say nothing of children. It is the fault of ventilation methods which are overdeveloped on their mechanical side. They are so bad hygienically because they are so good mechanically. Why?

All school ventilation by a mechanical system is based on the idea that the carbonic acid gas of a room is poisonous and we must add enough diluting air to keep its percentage down. We know now that carbonic acid gas is nearly harmless. Rosenau has shown that there are harmful chemicals in air that has been breathed; but not even this alters the opinion that the proper plan is to remove and not dilute.

A ventilation system which is based on the dilution of breathed air is inefficient and at the same time expensive. It is wasteful because it requires 2,000 cubic feet per person per hour while if the temperature is kept down, the humidity up, and the rooms are blown out from time to time a much less quantity gives much better results.

Mechanical systems are faulty for a second reason. The air is too still and too uniform in temperature. Hill proved that still air is harmful; Pflügge's pupils that air uniform in temperature is harmful.

The teacher can watch the temperature and humidity of the room with profit to herself and with no material increase in her trouble. Let there be a

wet and dry bulb thermometer in each schoolroom. Make it the duty of one student to make an hourly reading of each. From these readings the humidity can be determined by the chart which is a part of the hygrometer equipment. The temperature of the schoolroom must not be allowed to rise above 70°. The humidity must not be allowed to fall below 50.

How these requirements are to be met is the problem of the engineer, not the teacher. But if she will be insistent enough that these requirements are met she will be able to teach with far less effort than now. In addition, from time to time let the rooms be aired and the temperature lowered by opening the windows. The blowing that is good for sick air is the blowing that can be felt.

These are easy and worth while things. The doing of them adds but little to the teacher's burdens. On the other hand when they are successfully done they lighten the teacher's load. Attended to, three o'clock comes earlier in the day, Saturday gets nearer Monday and June gets in speaking distance of October.

Of course, in time the entire method of school ventilation must be made over from cellar to garret. The hygienists must lay down new standards and the ventilating engineers must meet them.

Improvement of Ventilation.—The Chicago Ventilation Commission has indorsed the following propositions:

1. In a mixture of air containing carbonic acid this gas does not settle out and rest near the floor.

2. The dilution method of ventilation is ineffective and uneconomical.

3. The putting of a given volume of air into a room does not necessarily constitute ventilation.

4. Ventilation is better done by air currents than by dilution.

Anyone acquainted with the present methods of ventilation knows that the theories of the ventilation system now employed are the direct opposite of these conclusions. It would be strange if the practice founded on wrong principles should be right. Therefore, we are prepared to find the practice faulty.

The principal faults of the Chicago practice are the following:

1. The temperature is not properly controlled; is not properly observed; is not properly taken; is generally too high.

2. The humidity is not properly observed; is generally too low.

3. The air in the room is too still.

4. The inside walls are too hot, the outside walls and windows are too cold.

5. The air as introduced in the room is too hot.

6. There is no provision for blowing out the room by putting the windows up.

Discussing these points in order:

1. Pflügge has demonstrated that high temperature is the most harmful agent in air which is harmful. It is now quite well accepted that in watching ventilation the main thing to watch is the temperature. The schoolrooms have a temperature which, theoretically, is fixed at 72°. But where is the thermometer placed? The outside walls are many degrees colder than the inside; the places near the hot air intakes are much hotter than any other

place in the room; the temperature varies in the different levels above the floor.

Does the thermometer show the average temperature of the room or the temperature of some point lower or higher than the average? The theoretical temperature is four degrees too high.

Suggested remedy:

(a) Set the official temperature at 68°.

(b) Furnish every room with a thermometer which can be moved to different parts of the room, that an average may be struck.

(c) Have the children or a child make an hourly record of the temperature in the room.

2. *Air more than 70 per cent saturated with moisture is very oppressive when it is hot and very chilling when it is cold. Air less than 50 per cent saturated with moisture dries the skin, nose, throat and bronchial tubes and causes infection when the air contains dust and bacteria.*

The humidity of the inside air should be within twenty points of that of the outside air or harm will result. Keep this point clearly in mind. If the outside air is at 32° F. and the percentage of saturation with moisture is 100, and if this air be heated to 132° and no water added to it or taken from it it will be about 3 per cent saturated with moisture. Such air dries up the tissues.

Says MacFie: "The living matter of the body contains about 80 per cent of water, and, on the water in its composition, its vital activity depends. Abstract the water and dry up the tissue, and its vitality is arrested or destroyed. In man, the loss of about 10 per cent of his body water means death."

The present plan takes in ordinary outside air and dries it by heat. No moisture is added. To make it healthy moisture should be added almost in proportion as heat is added—say as 4 is to 5. No observations on room humidity are made.

Suggestions:

Wet steam should be turned into the heating chambers.

Every room should be equipped with a hygrometer.

The children, or a child, should make an hourly record of the humidity.

3. Leonard Hill has proved that air cannot be healthy unless it is moving with a good deal of velocity. As it strikes the body it must have force enough to blow the foul air away. It must clean the breathing zone, the air around the head. It must clean the air around the body under the clothes—Sedgwick's "aërial envelope."

Still air is deadly. The present method aims to give the air a morgue-like stillness. The hot air, frequently around 130°, is introduced about eight feet above the floor. Theoretically the air blows across the room next the ceiling, diffuses to the floor and gently leaves by an exit near the floor line. The object is to do away with air currents.

Suggestion:

Equip the schoolrooms with electric fans to run during the winter. Fans are a source of comfort during the summer; they are a source of health during the winter.

4. Inside walls are always warm when the building is warm. If a person

could not get rid of the heat which he made and kept on making heat at the average rate he would reach the boiling temperature, 212°, in thirty-six hours. Fifty children in a schoolroom make a great excess of heat.

The inside wall and the children are two factors requiring no heat. The air for ventilation and the outside walls are two factors requiring heat. The radiation in a room should always be near the outside walls.

The present method keeps the inside walls too hot; and at the same time the outside walls are so cold that they sweat and frost if the relative humidity of the air in the room goes over 50. Therefore, either the outside walls and windows will be constantly wet or else the relative humidity of the air of the rooms must be so low that it is unhealthy.

Suggestions:

Set the fans so as to blow air against the windows as the storekeepers now do.

If there are no fans it is better to tolerate the window and wall sweating than to try to keep the pupils healthy with the overdry air now furnished.

5. Air which comes in contact with a human being should always be under 95°. If hot air is kept moving rapidly and the relative humidity is kept around 70 the harm is greatly diminished. Air entering the Chicago schoolrooms on a very cold day will range from 115° to 130°. It is very harmful if it touches any teacher or child.

Suggestion:

Every precaution should be taken to deflect this air so that it strikes no one until it is greatly cooled. The present methods accomplish this about as well as it can be done. The only remedy is in a radical change in the methods.

6. All are agreed that blowing out is the most effective method of cleaning. When the children return to the schoolroom from play they are making heat in great excess. If the room is over 68° they get overheated and sweat.

Suggestions:

All schoolrooms should be blown out during each play period. The children should return to a room in which the temperature is at 60°.

The intervals between blowings out should not be longer than four hours.

If the ventilation system cannot adjust itself to periodic blowing out of the room that of itself is enough to condemn the system.

The above suggestions are applicable to the present installations. None of them except the fans will cost much money. A combined thermometer and hygrometer can be had for about twice the cost of a thermometer. In the main, the suggestions call for some retraining of the school engineers and that is about all.

When new schools are built they should be heated and ventilated along the following lines:

1. Radiation placed along the outside walls.
2. Air intakes through the walls back of the radiators.
3. Air outlets located on the inside wall near the ceiling.
4. Outlet ducts in the attic equipped with exhaust fans.

5. Provision for discharge into the room of enough saturated steam to maintain the relative humidity at 50 to 70.

6. Provision for enough radiation to keep the room temperature at 68° F. and the temperature of the outside walls high enough to permit of a humidity of 60 to 70.

7. Windows which can be raised.

Fig. 503.—Perspective of Modern One-Room School.

Such a system can be installed for much less than the present cost of installation. It will do away with the present elaborate heating and mixing chambers. It will reduce the expense of installation of ducts much below its present rate. It will mean a smaller fan cost.

The volume of air to be handled need not be 1,800 cubic feet per pupil per hour. So large a quantity was demanded for the present system because of the mistaken method of ventilation by dilution. This can be reduced two-thirds. This will save enormously in the cost of heating. It will save in the volume of air to be handled and therefore in the cost of fan installation and maintenance.

On windy days the rooms on the windward side would require no exhaust. The fan work would then be limited to the rooms on the lee side. These items would much more than offset the cost of a steam or hot water installation. Besides, it would cost less to heat and humidify when the temperature was 68°

than to heat and not humidify where the temperature was kept at 72°.

Heating and Ventilation of the One-Room School.—The one-room school generally stands exposed to the wind. Its walls should be well insulated and its windows well chinked and provided with storm sashes. There should be deadening beneath the floor because at best the floor will be cold. The temperature of the room must not go above 68° and the wet bulb must stand as high as 56°. The room must be blown out by opening the doors at least three times during each day and the children must come from play into a room with a temperature of 60°.

We will assume that the room is heated by a stove located toward the

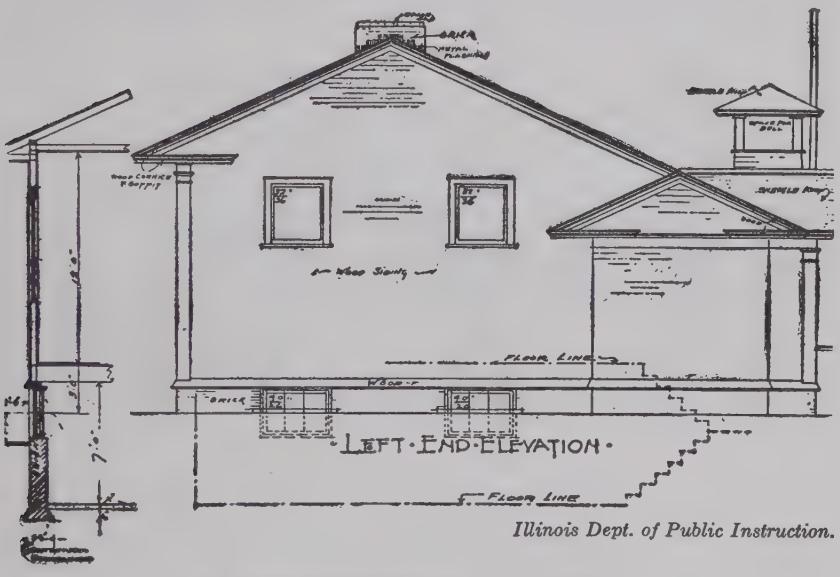


Fig. 504.—Showing Stairway to Basement.

center. The stove must be jacketed so that air flows between the jacket and the hot iron wall. It must be set close to the floor and be provided with perforations in the jacket to suck in cold air from the floor zone and warm it up. Fresh air should be taken through pipes which lead from underneath the house to the jacket and space around the stove. These ducts should be provided with dampers.

Outlets provided with dampers should open through the roof or into an unused attic where there is one. At least one outlet should be around the stovepipe to get the lift of the heat in the pipe as a means of emptying the foul air from the room. If it is necessary to economize fuel some of the fresh air can be brought in through a tube within or alongside the stovepipe so as to use some of the waste heat of the smoke to preheat the fresh air.

In order to moisten the air the upper part of the stove should be occupied by a water pan several feet square. The water must be near the boiling point. Gallons must be evaporated each day—say ten to twenty—enough to keep the humidity over 40.

To clean the air cheesecloth filters should be placed in the intake pipes.

These consist of two frames arranged like an embroidery frame. Into this frame a fresh piece of cheesecloth can be inserted.

The standards for country school ventilation are:

Temperature, 68°.

Foot zone temperature, 65°.

Wet bulb temperature, 56°.

Clean air.

Clean floor.

Air freshened several times a day.

Teaching in Cold Air.—It was inevitable that the teachers and pupils made anemic and listless by the warm, dry air of mechanically ventilated

Illinois Dept. of Public Instruction.

FIG. 505.—A LESS EXPENSIVE SCHOOL HOUSE.

schoolrooms should become discontented. When the school inspectors found such a train of enlarged glands and recurring colds as their statistics show this discontent started a demand for better school ventilation. From this demand three offshoots have crystallized:

Teaching in rooms where the windows are periodically opened.

Teaching in open-window rooms.

Teaching in open-air schools.

Each of these is suited to a certain type of child and unsuited to others. For the average child in a cold climate the first is adapted. For the child that has glands, is a mouth breather or catches cold easily the second is better. For the tuberculous child and the child from a home where there is active tuberculosis the third has been worked out.

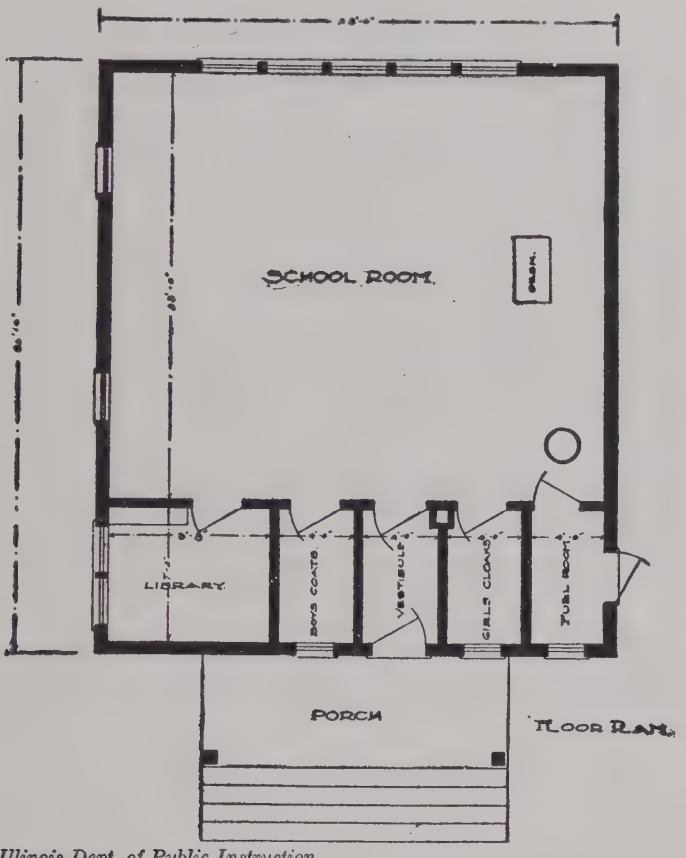
A procedure so simple as opening the windows is best carried out according to a plan. I know of none better than to throw them wide open for the last five minutes of all recess periods and for one minute each hour during the teaching periods. The janitor can shut down his fans during these periods, or the teachers can place a board over the ventilation inlets and outlets if heat cost is complained of.

Children returning from play to a schoolroom will cough and show other evidence of discomfort if the room is warmer than 60°.

When the windows are thrown open all parts of the room are of the

same temperature. People complain not of the cold rooms but of the cold places in a warm room—the floor, next the windows, near the doors. A general room temperature of 60° where the windows are open wide is not so liable to cause complaint as in a room in which a window is raised a little way.

Open-window rooms and open-air schools require unusual teaching arrangements and are needed for none but unusual children.



Illinois Dept. of Public Instruction.

FIG. 506.—ONE-ROOM SCHOOL.

Cold-Room and Open-Air Schools.—The temperature of cold-room schools should not go below 55° even in the coldest weather. It should not go above 60°. There should be enough radiation to maintain this temperature where the windows are wide open. The children should wear their coats, woolen gloves and caps in the schoolroom.

School lunches are not especially needed in open-window schools. Most school children would learn faster if they were better fed but this need is not materially greater with open-window school children than with the general run.

The temperature of open-air schoolrooms is that of any sheltered, shady, outside area. Children attending outdoor schools must have special clothing,

special food, special rest hours and special medical attention. They wear felt boots, woolen mitts and a flannel oversuit with hood. They are given three meals a day.

LUNCH AT 9 A. M.

1 glass of milk, cold or hot, with bread; or
1 bowl of soup and bread.

DINNER AT 12 M.

2 glasses of milk and bread and butter.
1 bowl of soup.
Meat—beef or mutton. Sometimes fish or eggs.
Vegetables—potatoes (one), peas or beans. (Green vegetables when possible.)
Dessert—Fruit, raw or stewed, or pudding.

LUNCH AT 3:30 P. M.

1 glass of milk, bread and butter and occasionally jam, jelly, or molasses.

After lunch they should be required to rest by lying down for one hour.

They should be weighed periodically, measured, and examined at stated intervals.

In spite of the physical handicaps of the cold-air students—for none but moderately subnormal children are given this special treatment—they grow fatter and become rosy; their enlarged glands subside; their disposition to catch cold decreases. From the educational standpoint it pays, for they learn fast and attend regularly.

The per capita cost of the open-air school is too high to make it available for the ordinary run of students.

The per capita cost of open-window schools is not much above the average except in those cases where, for special reasons, special medical and nursing service is given and free lunches are supplied.

MEDICAL SCHOOL INSPECTION

Children of school age are undergoing rapid changes. They double in size and weight within a few years. Their bodies take on new shapes. Their brains increase in volume and improve in texture. The change in mental capacity from that of the first grade student to that of the fourth year high school student is no greater than the change in the physique during the same years.

A few years ago there were people who did not believe in education. There are some now, but they are few.

The mind of the child, during education, needs the supervision of teachers—so much practically everyone now concedes. It is just as inevitable that everybody should eventually see that the physical side of school children needs control and direction.

School life is essentially social. In that lies its great educational strength. In part is this true of book education. Especially is it true of education in life, in self-discovery, in perspective, in meum and tuum.

It is impossible to conceive of advantages without disadvantages. Something for nothing is impossible. When children congregate, colds, measles, scarlet fever, and other contagion will invariably come along.

In the country where gossip is a pretty fair school inspector contagion depletes the schoolrooms somewhat. In the city, where gossip is not worth much as a moral agent, uninspected schoolrooms average less than 90 per cent full.

Partly full schoolrooms mean inefficiency. In other words, the taxpayer is not getting all he is paying for.

And then, periodically, an epidemic sweeps along. If there is no school inspection the schools must close. If there is school inspection they can be kept open. To close the schools means waste of the taxpayers' money.

Teachers say classes could get on much faster if the students all attended regularly and all were in good health. Ask any teacher if this is not so. If the mouth-breathing child, the child with the snuffles, if any neglected child is holding the class back, whose liberty is being interfered with? If the class is being held back by such children—and any teacher will say so—is not the taxpayers' money being wasted?

In Chicago there are not seats enough to take care of all the children who want to go to school. There would be ample if the children were all bright enough to have the classes push along rapidly and if nobody failed to make grade.

Mrs. Young tells us that repeaters—children who fail to make grade—cost Chicago $200,000 a year. Now, everybody is agreed that bad eyes, bad teeth, bad throats, bad physical condition generally, are responsible for more than 90 per cent of the failures to make grade. It does not seem right to throw this great burden on the taxpayer if there is any way to prevent it, and everybody knows there is a way to prevent it, and that way is through care of the health of the children.

And yet there are those who would encourage a small minority in fastening these burdens on the majority!

Benefits of School Inspection.—*A few years ago we closed our schools to stop epidemics. Now to stop an epidemic we keep the schools open and control the epidemic through school inspection. It has even been proposed that epidemics in vacation season be met by opening the schools and providing inspection.*

It costs a good deal more to close the schools than it does to maintain a temporary inspection for contagion and besides, inspection is much more efficient. Under the old plan we would fumigate the house and thereby kill any lonely bacillus that might be hanging around. Then we would bring back the school children and have one scarlet fever scaler come in with a million contagion germs in his throat.

Now we know that it is people, not things, that we must watch. And this, of course, adds greatly to the responsibility of the already burdened grade teacher. If the school has a well executed medical inspection and good school nurses the teacher can keep her mind on teaching her pupils. If she has neither of these she stands on guard alone and she must divide her mental energy.

I think there is no question that if there were no school children there

would be little scarlet fever or diphtheria—certainly little diphtheria. Wherever the school children are vaccinated there is no smallpox. At least there is so little that health officers do not worry about it. The control of diphtheria is coming near enough within range to allow us to say, "When there is no danger of infection of school children then there will be little diphtheria."

Since the teacher stands on guard at the point where the enemy is going to strike she must not sleep at her post. She must learn to draw common sense conclusions from sore throats, snuffles, rough skins, fevers, headaches, absence from school and stories of sickness at home. Many of her conclusions will be mistaken but the guard must sound the alarm even though the danger is finally found to be imaginary.

If the school is the usual means by which contagion is spread should it not be one of the agencies by which it is controlled? Or, to put it differently, if the community by its practices makes the school a spreader of contagion is it not up to the community to establish practices that will make the school a means of controlling contagion?

The teacher has a selfish interest in this matter. She is more liable to contract contagion than is the average member of the community. The sentinel is always in danger.

Dr. Luther Gulick told the National Education Association that before many years anemic, physically below par children would be sent to school to get well—an outgrowth of the practice of using the schools to control contagion.

Medical Inspection in Chicago.—In Chicago the inspection of school children consists of several parts:

1. Inspection to exclude contagion—a service performed by the Health Department.

2. Inspection to exclude minor communicable conditions such as lice, itch, and some other skin conditions—service performed by the health department through medical inspectors and nurses.

3. Inspection, examination, and special attention to markedly defective children; for example, the blind, deaf, crippled and markedly subnormal—service by the board of education.

4. Dental inspection of school children and dispensaries for relief—service by philanthropy under direction of the dental society.

5. Physical examination of the school children with advice given the parent that treatment would be beneficial—service formerly performed by the health department medical inspectors and nurses.

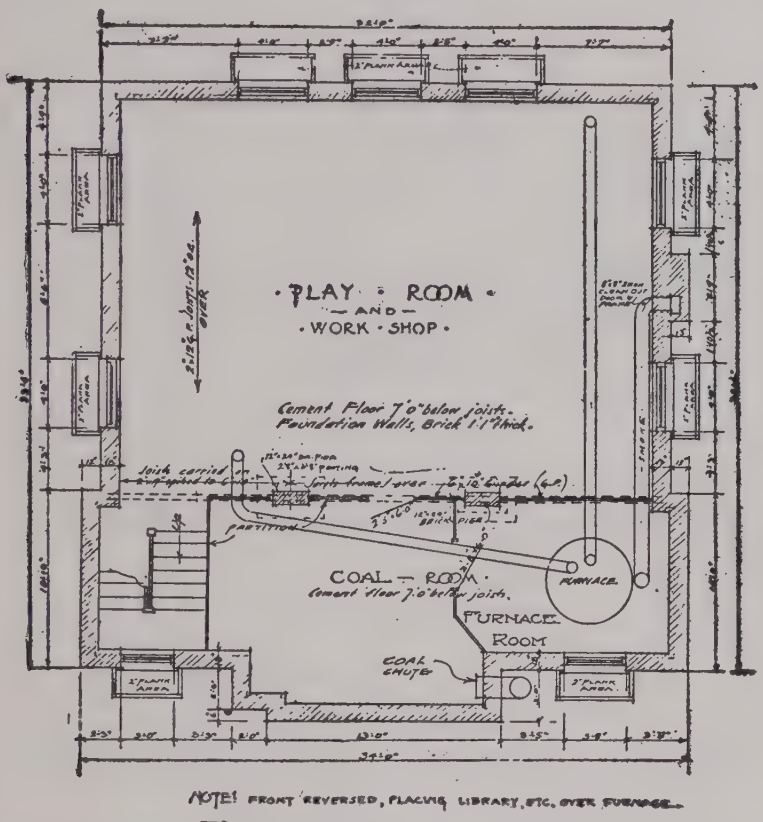
6. Request that parents have their children examined physically at the beginning of the school year and that the results be forwarded to the school board—request made by the board of education; blanks furnished by the board.

Services Nos. 1, 2, and 3 have been a part of the school routine for about four years and No. 4 for about two years.

One spring the National League for Medical Freedom advertised its opposition to Nos. 1 to 5 inclusive. This opposition was to the expenditures of public money for the compulsory examination of school children. Forced to tie up its opposition in some way with medical treatment the League

declared the intent of the authorities to be at some time or other to compel treatment. Inferentially, the treatment, when the time came to give it, would be compulsory and would be given by one school of medicine to the exclusion of all others.

The League has a wonderful nose for fear. It has a wonderful capacity for foreseeing what may happen some time or other, of which it proceeds to get afraid.



Illinois Dept. of Public Instruction.

FIG. 507.

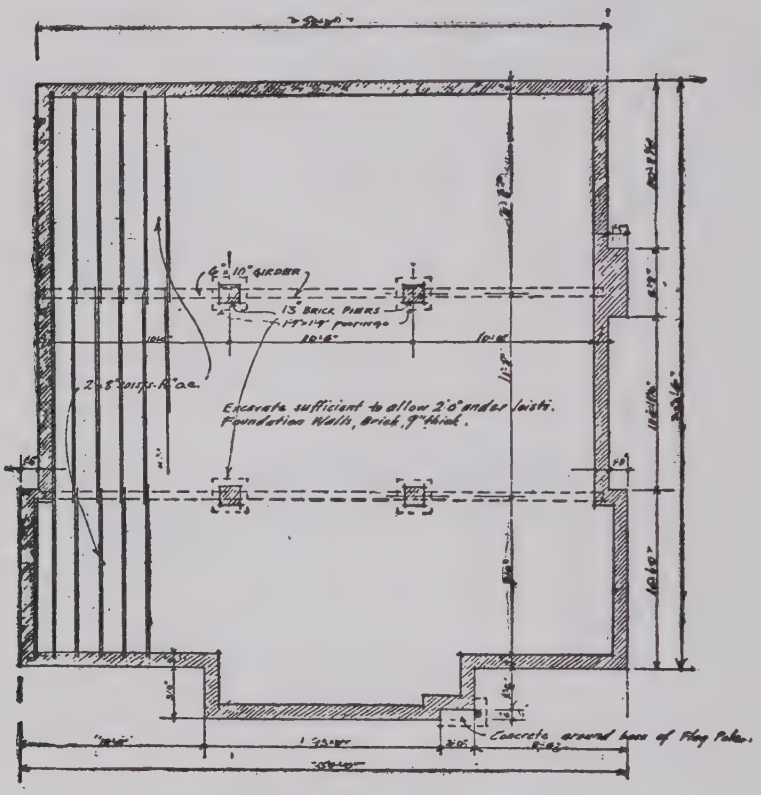
The following fall the board instituted No. 6—a recommendation that the parent have the physician of his choice examine his children—whereupon the League came out with a circular condemning that recommendation.

As I have understood these Freedomites the freedom of the family to employ whom they pleased was just what they wanted. Now, when they get what they want, they are "agin" it. When government goes ahead on a constructive policy, they are "agin" it. If government modifies the policy to give the Freedomites the freedom asked for, they are "agin" that.

They defy the government to jump any quicker than they can. Nobody can hop on their rock any quicker than they can hop off. They are the

champion hoppers. In comparison a flea is a puling paralytic. As a matter of fact, they switch their argument as they deem it expedient to do so, holding fast, however, to their fundamental position.

They do not believe in physical perfection or physical imperfection; in physical efficiency or physical inefficiency; in contagion or immunity; or in any of those things. They believe that talking about these "errors" creates the conditions found. On this they base their opposition to school inspection.


10" GIRDER
13 BRICK PIERS
Excavate sufficient to allow 2'0" under joists.
Foundation Walls, Brick, 9" thick.
Concrete around base of Hay Poles.

FOUNDATION PLAN

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FIG. 508.

This they hold unchangeably. This makes a perfectly proper line of cleavage. Those who believe in that way should oppose school inspection. Those who believe otherwise should support it.

Work of the School Inspector.—As the work is now divided the school inspectors are divided into two groups—those who inspect for contagion and those who examine for physical defects. The first group examines the children to discover smallpox, scarlet fever, diphtheria, measles, whooping cough and a few diseases of lesser consequence. When a case is diagnosed as one of contagion the child is sent home and a quarantine is established.

The inspectors do not treat cases. They are prohibited from taking any part in the treatment of any case. Their duty is to see that the rights of the community are protected.

In the cases of ringworm, itch, lice and similar mild communicable conditions they make the diagnosis and instruct the nurse what to do. At one time it was the custom to exclude these children from school after advising the family to have a physician tell them what to do. It was found the plan did not work. The parents would not call a doctor for a simple condition like lice. They would do nothing and the children just stayed out of school indefinitely.

Each school physician does a certain amount of vaccinating in his schools. A few years ago the Illinois Supreme Court decided that Chicago could not have compulsory vaccination unless the city council passed an ordinance requiring it; that the health department, acting under the general police power of the cities and village acts, could not require it. This is what those called the anti-vaccinationists usually refer to as a decision against vaccination. The decision was given long enough ago for its effects to begin to show. There were some cases and some deaths among school children from smallpox last winter—the first in many years. The vaccinating is done on those whose parents want it done. About 99 per cent of the children are vaccinated.

When children have been out of school for several days the school inspector must pass upon them before they are allowed to mix with the other children. This is a brief statement of the work of the medical inspector for contagion.

The examiner for physical defects examines the eyes, ears, nose, throat, mouth and teeth of the child. The clothes are not removed. In a general way deformities, poor muscular development, anemia, heart and lung diseases are guessed at from the history and from general appearances. A report of the findings (with recommendations) goes to the parents, another to the school and a third to the health department.

If a parent sees fit to neglect his child there can be no compulsion. The examiner does not treat the children. If the child is defective and as a result the teacher finds teaching is difficult she must do the best she can, since the parent cannot be forced. If other children are held back by this child they must put up with it. The parents cannot be forced. If this dull child helps to overcrowd the schoolroom and keeps the other children from getting an education it cannot be helped. If such children increase taxes it cannot be helped.

The school inspector can exclude contagion—beyond that his work is wholly advisory.

What the Parents Have a Right to Expect from School Inspection.—Parents as a group have a right to demand:

1. That contagion will be less than in uninspected cities of the same size in the same climate.
2. That epidemics will be more than twice as far apart as before school inspection.
3. That it will never be necessary to close the schools for contagion.
4. That each generation will grow up stronger than its predecessor.
5. That there will be fewer deaf, fewer hunchbacks, fewer cripples.

6. That eventually the schools shall be properly ventilated.

Every parent has the right to expect:

1. *That his child shall have fewer colds, fewer coughs, fewer sore throats, less rheumatism and less heart disease than prevailed before inspection.*

2. *That his child shall go through his school life without ever having been in danger of smallpox or of losing a day from this contagion.*

3. *That his child shall go through school life without having diphtheria.*

4. That his child's chance of scarlet fever shall be reduced to one out of six; of measles and whooping cough to less than before school inspection.

5. To be told when sore throats are due to diphtheria and when to ordinary bacteria.

6. That his child shall not get lice or itch or ringworm in school, or, if he does, that school inspection shall correct the condition promptly.

7. That his child shall have headaches rarely or never; not be tired at night or listless or pale and flabby looking.

8. That his child shall not become a mouth breather or get to be lantern-jawed.

9. That his child shall want to play, enjoy play and know how to play.

10. That his child shall make at least one grade a year and every year or so an extra grade.

11. That if his child be feeble-minded or deaf or blind or crippled or tuberculous he shall be cared for by special teachers in special schools and in a special way.

The parent should support his child in school, requiring him to make little if any money during the school years.

That is about what the law says and it is good sense and good judgment as well.

If the parent is forced by law to keep his child in school for six hours a day five days a week for ten months a year for eight years he has the right to insist that the schoolroom be well ventilated; that contagion be kept out of the group; and that the school do everything it can for the physical welfare of the children to the end that they study better, learn faster and grow up in strength.

Parents, demand your rights!

Exclusions from School.—The New York health department recently has revised its rules for excluding children from school on account of contagion.

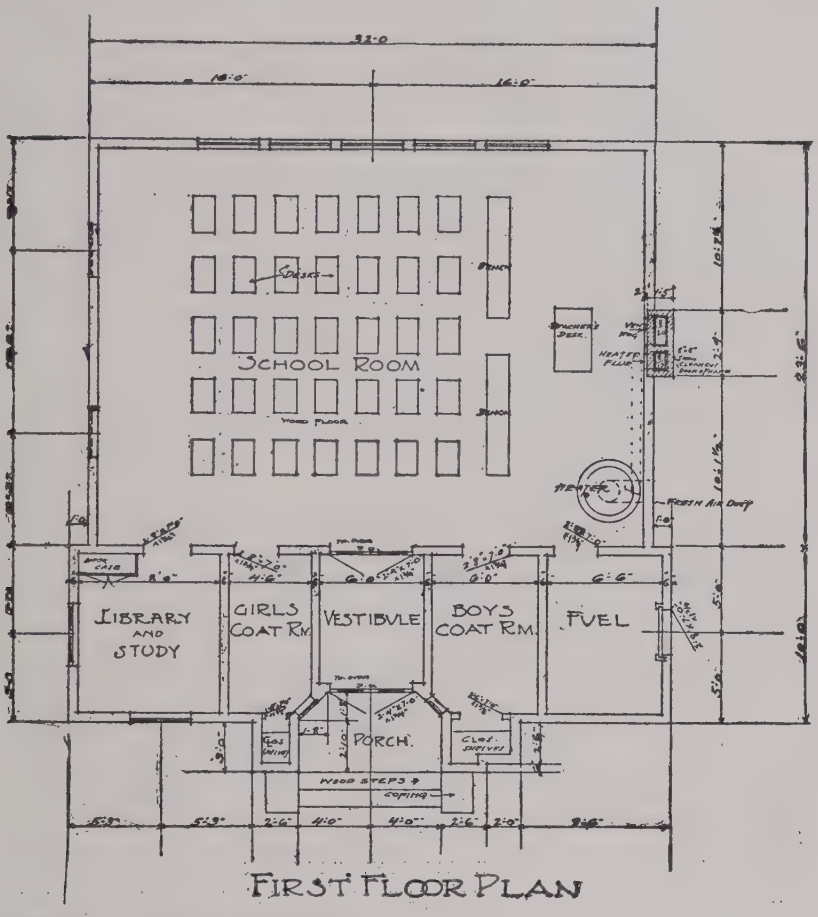
Children suffering from diphtheria are excluded for at least one week and are not readmitted until the throat and nose are well and cultures are negative. The certificate of health for readmission must come from the health department. Children from the same family residing at home can be readmitted to school at once if quarantine is well kept and throat cultures are negative.

If quarantine is not kept all children from the family are excluded until the quarantine is raised. If children are removed from the infected home they will be readmitted to school if cultures from their throats show no diphtheria bacilli.

Cases of scarlet fever are excluded for at least five weeks or until the skin has stopped shedding and all discharges from the nose and throat and all cough has stopped. Elsewhere in the report the statement is made

that it is very doubtful that peeling has anything to do with the spread of scarlet fever.

Nevertheless, the authorities do not feel certain enough of their ground to rule that peeling can be disregarded and attention concentrated on the nose and throat discharges.



Illinois Dept. of Public Instruction.

FIG. 509

When the scarlet fever germ has been discovered and studied we may be able to shorten the exclusion period of some cases to one week, as with diphtheria, but that time has not yet arrived. If quarantine is kept those children in the family who previously have had scarlet fever are allowed to remain in school.

Children of the family who have had scarlet fever but who have been removed from the house where the case occurred are allowed to return to school after five days if in the meantime no scarlet fever has developed among them. If they continue to reside at home they will be excluded from school until the cases are officially discharged.

In measles the patient is excluded from school until five days after the appearance of the rash at which time (if the cough and all discharges have disappeared) he can return to school. Those children who already have had measles can continue attending school if quarantine is kept.

As the incubation period of measles is fourteen days children removed from the home where a case is found are not admitted to school for fourteen days after the removal. In German measles the child is excluded from school for one week and admitted upon a certificate from the school doctor.

In whooping cough the child is excluded until the whoop has entirely stopped, say in from six weeks to two months. In mumps the child is excluded until the swelling has disappeared. In chicken pox the child is excluded until the scabs have disappeared. As this disease is so liable to be confused with smallpox the rules insist on an inspection by the school doctor.

The School Nurse.—The report of the Committee on Medical Inspection of Schools to the Section of Preventive Medicine of the American Medical Association gives the following as the work of the school nurse:

"School nurses are assistants to the staff. Their field work is essentially as follows:

"To assist members of the staff in the skilled examination of pupils and otherwise as assistance is needed.

"To assist teachers in making preliminary surveys of their pupils and in giving initial examinations, notifying parents of essential needs of pupils, etc.

"Visiting parents and in all justifiable ways establishing effective co-operation between home and school.

"Further, the function of the school nurse is that of the social educator in the field of hygiene. As such the work of the school nurse is one of high order.

"The staff of experts, the teaching force of the schools and school nurses, working from the standpoint of education, form an educational corps to secure the effective coöperation of home, school, and school authorities in meeting the requirements of the physical and mental health and growth of pupils. When educational means fail the law must remedy instances of neglect of health and growth of children."

When a physical examination has been made and the parents have been told what should be done but a small part of the work has been accomplished. Cornell's experience is that only a small percentage of the parents will accept the advice given. The percentage will vary according to the neighborhood. Some neighborhoods take care of the children better than others. Some inspectors are much more successful in getting work done than others.

The nurse goes to the home, gets hold of the parent, talks over the whole matter and often takes the child to the hospital, dispensary or physician. Some nurses can persuade every parent to have his child cared for; others are less successful.

School Inspection for Abnormal Children.—In order that unusual children may be more accurately studied and the proper treatment given them Dr. MacMillan of the Child Study Department of the Board of Education (Chicago) established a series of averages, "norms" or measuring rods, by closely examining 8,000 children. The examination covers the following points:

1. Age.
2. Height—standing and sitting.
3. Weight.
4. Endurance and persistence.
5. Motor ability and strength.
6. Lung capacity.
7. Head measurements—the length, breadth, circumference, estimated cubic dimensions—internal and external.

The physical examination goes hand in hand with a mental test covering the following points:

1. Acuteness of senses—sight, hearing and touch.
2. Perception, sensitivity to likes and differences.
3. Memory.
4. Association.
5. Types of thinking.
6. Types of learning.
7. Range of information.

The normal having been established, those reasonably near it are cared for in ordinary schools and by the ordinary teaching methods. Those far away from the norm line are specially studied and sent to the group in which they belong where, sometimes by one method and sometimes by another, such mental and physical treatment as they need is received.

In a group of fifty children there will be found about thirty-five of nearly the same ability and strength, five may be unusually bright and ten may be unusually retarded or below the average.

When a boy fails in his studies the temptation to blame him is strong. If he fails to pass from one grade to another at the end of his school year his mother (and maybe others) is disposed to blame the teacher. Now, sometimes the boy should be blamed and sometimes the fault lies with the teacher but with our old hit and miss method injustice was the rule. Is it not fairer to study the student closely and then measure both him and his teacher by the result of the study?

It has been more than two centuries since we burned women, thinking them witches because of some departure from the normal. It has been half a century since we punished the insane.

It will be some years before we fully understand that the abnormal child is so because of the sins of his ancestors or because of the contagion, bad hygiene or bad nutrition of his earlier years; that the wise and economical thing to do is to study him from the mental and physical standpoint; and, finally, that school funds are saved by proper attention to the physical side of the child.

The provision made by the Board of Education of Chicago for the distinctly unusual child is the best in the world. It is done in a bureau called the Bureau of Child Study. Its field is that large group of children who are so much out of the ordinary that they cannot be cared for in the ordinary schoolroom in fairness to the fifty children there and certainly not in fairness to the unusual child himself.

In this bureau unusual children are grouped as follows:

1. The abnormally bright—about five hundred a year of this type are examined. It may seem paradoxical to treat these children in a bureau for sub-

normals but experience has shown that while they are abnormally clever on one side of their make-up they are dull or deficient in some direction. They are at least so exceptional as to demand individual attention.

2. Those with speech defects, stammerers and stutterers particularly. For these there are four special teachers.

3. With hearing defects. For these there are thirteen centers.

4. With eye defects—the blind and those with especially poor vision. For these four centers are now established.

5. Crippled children. For these there are now two centers. Certain cases are cared for in town and certain others in the country.

6. Truants and incorrigibles. For truants there are now three centers. The function of these is to take care of the truants and to prevent them from developing into the group termed incorrigibles—the group cared for at the Parental school.

7. Subnormals. In this connection is meant the lowest grades of minds still subject to improvement through education. This group extends to those who have to repeat a grade more than once, to those who are able to get no farther than the third grade by the time they have reached fourteen years of age. For these there are thirty-two special rooms.

These defects are not due to chance. Most of them are inherited; many are acquired through contagion in early childhood, through summer complaint in babyhood, through neglected colds resulting in ear infections, through drinking milk from diseased cows. Many result from insanitary homes.

Chicago has found it economical as well as humane to establish a separate department for such children, to group them properly and teach them in the right way. It saves money and gets results.

If a city or town has no such department it is wasting money. It can be certain that the defectives in its school population are in about the same proportion as in Chicago. Of course, a country school must handle all of its children together, sound and defective, and put up with the economic waste and inefficiency; but it pays a town having a school population of more than a thousand to divide the children into two groups—average and unusual. When the school population gets over five thousand the unusual group should be still further subdivided and proper treatment given. It is wise—it is just—it pays.

FEEDING THE GROWING GENERATION

Many mothers, earnestly concerned about the growth of their children, call our attention to many instances of underfeeding and failure of growth and proper development. They ask for information as to the kind and amount of food their boys and girls ought to get.

The infant has found many champions, but the growing youngsters, from 7 to 14 years old, find themselves beset and hemmed in by a multitude of don'ts about eating that would dishearten any child were it not for the healthy and imperative command of the growing body that makes the child see the food only and not the don'ts. There are not lacking narrow, dyspeptic, vinegar-hearted individuals who are afraid Young America will eat up the earth.

The healthy child wants to know nothing about the schemes of raising it on a nickel or 8-cent ration a day and getting along on the leavings of such a ration the next day. *The healthy child wants and ought to get four or five meals a day. It wants and needs plenty of milk, eggs, meat, bread, and butter. It should get it. It wants and needs vegetables, fruits, soups, jellies, and other wholesome and simple foods.*

The weight of the child is a better guide to the amount of food it should get than the age. Children of different ages but of the same weight require the same amount of food.

The following dietary for a child of 10 is offered, not to be followed in every case but rather as a suggestive guide:

BREAKFAST

1. Four ounces of bread or a roll.
2. One ounce of meat.
3. Butter.
4. Cup of milk.

NOONDAY MEAL

1. Plate of soup.
2. Four ounces of meat.
3. Vegetables.
4. Sauce.

AFTERNOON MEAL

1. Bread or roll.
2. Milk or cocoa.
3. Preserves.

SUPPER

1. Cup of milk.
2. One egg.
3. Some meat.
4. Bread.

Fruits, jellies, etc., may be added to each meal. If the child wants more, let him have it; if it is too much, he will let it alone.

"The foundation and first condition of a diet is a definite minimum amount of proteids, fats, and carbohydrates, capable of sustaining the body and insuring a gain in weight."

During infancy more food is required in proportion than during childhood; during childhood the relative amount of food required is greater than in adult life. The reason is that growing children not only have to replace the constant wear and tear of tissues but they also have to build bone, make muscle, store up nervous energy, and fortify the system against strain and disease.

Underfed children fall easy victims to acute and chronic diseases, have weak mentality, and lack the firm, courageous spirit of self-reliance. Don't let chronic underfeeding pass for gentility. In feeding growing children, their needs and appetites should be consulted and not ours.

Babies and adults usually are overfed; children usually are underfed. Be generous with the loaf.

ATTENTION TO NEGLECTED CHILDREN

On first thought anyone would say that if a school teacher, having noticed one of her pupils was not progressing in his studies, had sent him to a school physician for examination and the examination had shown that the child was a mouth breather, had poor teeth or poor eyes there would be no trouble in getting the parents to put the child in good physical condition. One would think that upon receipt of a note from the teacher or the physician they would at least go to some physician to see what he thought about it.

What are the facts?

Cornell's "Health and Medical Inspection of School Children" gives many instructive tabulations regarding the relative efficiency of different methods of interesting the parent. Intelligent notices written by a good inspector to parents in good neighborhoods secure treatment in one case out of three in eyestrain and one case out of two of the nose and throat difficulty.

The average inspector's notice secures attention in about one case in five. An indifferent inspector sending out formal, impersonal notices can get help for only about one child in twenty. Written notices to foreigners usually accomplish nothing, since they cannot be read by those who receive them.

If there is a neighborhood dispensary the chance that the notices will be heeded improves materially. When the notice fails to secure help for the needy child the school nurse or a social visitor follows it up. She gets results from one visit in a little more than half the cases seen.

A comparison between the results of school inspection in two groups of 750 children each—one without nurses, the other with—shows that the percentage heeding the advice as to defective vision rose from 25 to 80 per cent; hypertrophied tonsils, 18 to 65 per cent; adenoids, 14 to 72 per cent; defective teeth, 20 to 92 per cent.

In more than half the cases of this series where the parents paid no attention to the note from the school physician they were persuaded by the school nurse.

Another idea of the difficulties may be gleaned from the following report on 129 Russian Jewish and Italian children needing glasses. On advice given at the school by the inspector and nurse 18 secured glasses; on one visit by the nurse, including 17 cases escorted to dispensary, 42 secured glasses; as the result of repeated home visits by the nurse, including 12 cases escorted to the dispensary, 48 secured glasses. A total of 108 results and 21 failures.

Medical inspection without a nurse follow-up service scarcely pays.

LARGER USE OF THE SCHOOLS

In addressing the National Educational Association Professor Ward of Wisconsin advocated making the schools the voting places and the school principals the election clerks. This was but a part of his argument that the way to democracy lay in the use of the schoolhouse for all sorts of political and social functions.

It does not seem fair to charge the entire cost of the school system against the kids. They use the equipment for but a few hours during the day,

a few days during the week and for only ten months of the year. Would it not be fairer to devise a way to have the grown people use the buildings, libraries, halls, gymnasiums and swimming pools for the rest of the time and then split the cost between the kids and the grown-ups?

Whenever it is proposed to pay the teachers better salaries up bobs the statement that half of the taxes and half of the bond returns now go to the schools. It would take some of the force from this argument if the schools were made use of as a center of diversion, entertainment and education for the grown-ups.

We need moving pictures. They have gripped the public. Through them we can teach health, morals, history, geography, science, life. The privately owned places but partly fill the bill. Why not use the schools?

We are all agreed that health is better than it was; but it still is not what it should be. In America it cannot be greatly improved by coercion, legislation or government control. Improvement must and will come through education. But of whom? Both children and adults. Then why not use the schools?

At this meeting of the teachers it was evident that the tendency is strongly toward a use of the schools for many community purposes. On Wednesday there was a rich program on recreational, social and civic opportunity through the schools. It was valuable both because it told what is being done and what should be done; but it was more valuable in that it brought out the trend of the times in bold relief.

The next morning Professor Ward pointed out the enormously expensive mistake made in Chicago twenty years ago when the playground system was vetoed by the board of education and was forced thereby to grow up apart from the schools. That afternoon Professor Allyn told the plan by which Westfield, Massachusetts, and several other places had used its school laboratories to purify its food supply, and so far from hurting the schools as such it greatly improved them—an example that should be followed by one hundred towns within a night's ride of Chicago. Several speakers, prominent among whom was a Gary school teacher, told of similar activities. Professor Shephard told of some valuable related work in the Lucy Flower High School in Chicago. Professor Works, formerly of Madison, Wisconsin, told of how they made botany practical at Menominee and Professor Randall of Brooklyn of methods of making physics a study of service.

It was plain that many schools are not in favor of what Allyn calls the pupil-alone policy. When men hurrahed about vague political propositions the old brass band method was well enough but this is the dawn of the health age—the age of men. As I see it, the use of the schools by adults is a necessary part of the program of the new democracy. I don't see how anybody who attended these meetings could be of any other opinion.

SCHOOL LABORATORIES

One of the recommendations of the Standards Commission of the New York Mill Committee was that school laboratories examine specimens of market milk chemically, bacteriologically and for dirt.

There are few communities with less than 50,000 inhabitants that have

laboratory facilities for their health departments. On the other hand, even country communities have some laboratory facilities in their schools. To teach chemistry and bacteriology by teaching milk testing gives just as good training as though the analyses were of substances interesting to nobody.

Simple milk analyses are simpler than the usual run of laboratory tests. A fair percentage of the farmers now own small Babcock testers and test their milk for fat. This test is not too complicated for grade school pupils.

The dirt test is still simpler. In fact, it is so simple that it can be used as one of the initial exercises given to familiarize the pupils with glassware and methods.

A bacterial count is easily within the reach of high school pupils and, possibly, of grammar scholars. It does not require a microscope. It does require a magnifying glass, culture media and certain glassware. The equipment for milk work does not stand in the way nor does technical skill. Thus we see that neither the cost of equipment for milk nor the technical skill required for milk tests stands in the way of using the school laboratories for milk control.

The guinea pig test for tuberculosis should be easy in a school that teaches biology. It requires little equipment and little skill.

So much for the possibilities. What would be the gain? A good many baby lives could be saved and the milk business could be put on a much less precarious basis if the school laboratories would supplement the health department work. If the people knew that their milk was being examined their confidence in it would grow. The use of milk responds to fluctuations in public confidence. At least such an effect would come as soon as publicity had forced the insanitary dairies to clean up—and nobody should want it to come sooner.

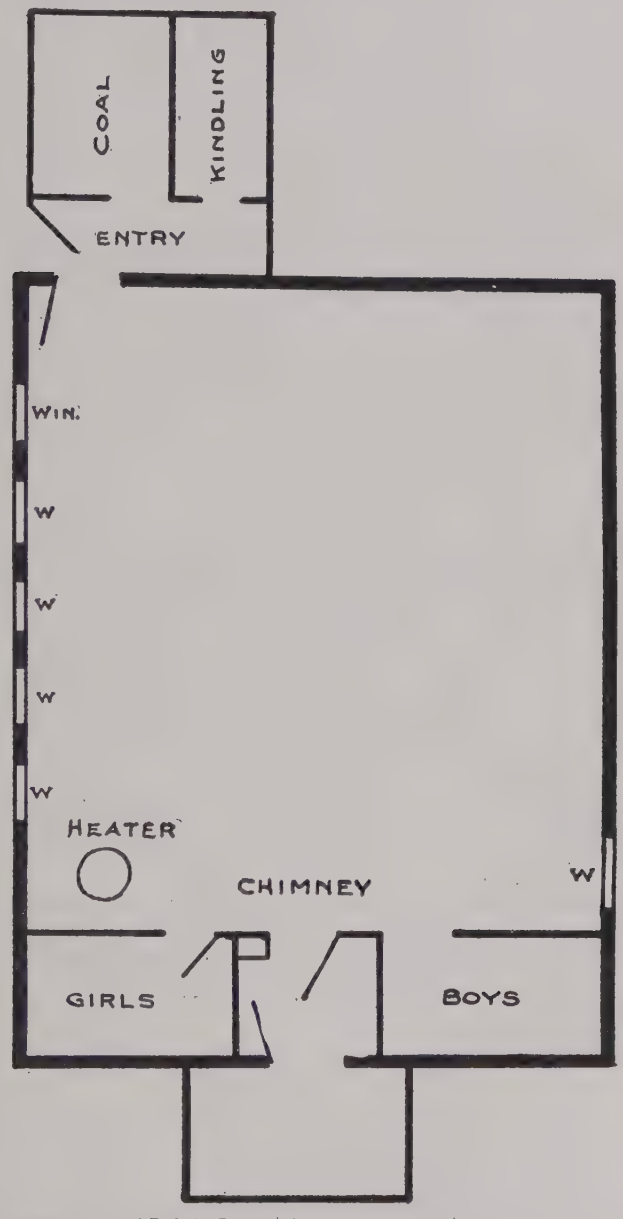
In high schools the coöperation between local school laboratories and health departments could go even farther. Such laboratories could examine sputum for consumption, blood for typhoid and possibly cultures for diphtheria. Any properly run laboratory sterilizes sputum before it is examined. They do this to safeguard the health of the workers. This precaution taken, there is no danger.

The Widal test for typhoid fever is even less dangerous. The drop of blood sent in for test contains no bacteria. The equipment for these two tests can be bought for a hundred dollars.

If there is carelessness there is some danger from diphtheria, yet there is no question but that making such examination in the school laboratory would mean less diphtheria in town. For instance, if the Centralia, Illinois, school laboratories examined throat cultures the diphtheria outbreaks in those schools would be farther apart and easier controlled than under the present system wherein the cultures must go to Springfield. If the school administrators assert that the program is too large why not undertake a single part of it—say milk examination, or better still, examinations for contagion among school children?

VILLAGE SCHOOL HYGIENE

In Minnesota Dr. E. B. Hoag is concentrating on rural and village schools. The plan of the state board of health is to have the rural schools inaugurate and carry out school inspection. It is true that they have a plan for



Illinois Dept. of Public Instruction.

FIG. 510.—INEXPENSIVE CLOAKROOMS, ENTRY, AND FUEL HOUSE.

large cities like Minneapolis, St. Paul and Duluth—a plan that calls for medical officers and school nurses. They have another plan for towns large enough to employ school nurses.

The plan upon which they are now laying most stress is one for non-

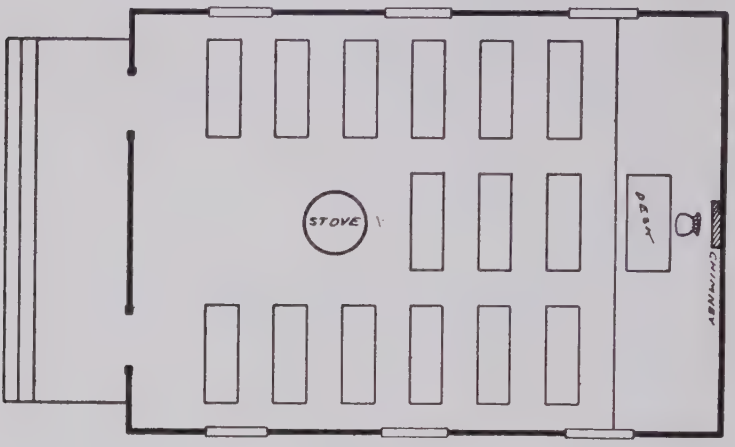


Fig. 511.

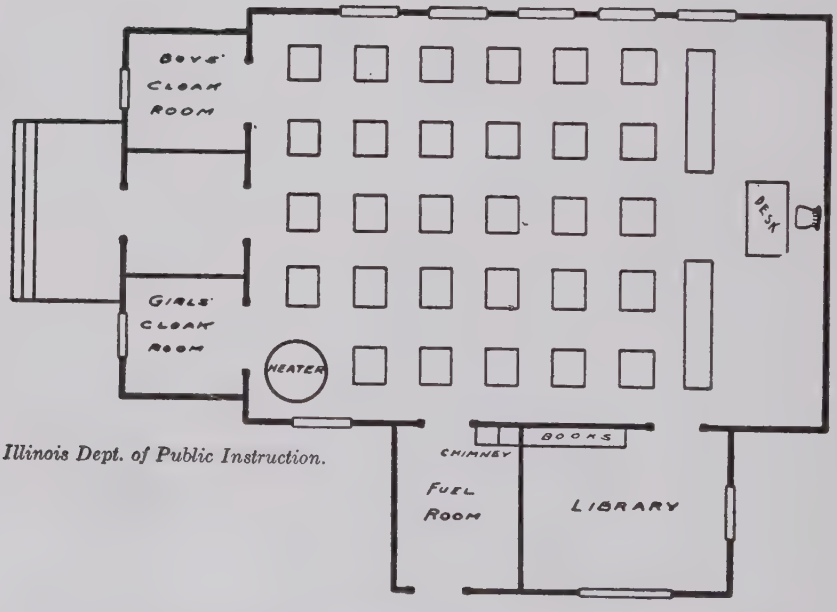


Fig. 512.—Showing Old Style Country School House and Manner in Which Such a One may be Modernized at Small Cost. The improvement suggested does away with the platform and the double desks. It provides a vestibule and two coat rooms in front, a fuel room and library at the side. The lighting is from the left and the rear and is perfect.

medical health surveys to be made by the teachers. This plan is for communities that feel they cannot afford either school physicians or school nurses.

The essence of their plan lies in this statement: *No community need wait for the employment of a medical officer in order to begin sensible health observation of school children.*

The plan consists in having written answers to a series of simple questions. Some of these questions may properly relate to simple matters of schoolroom hygiene. Some of them relate to conditions of the pupils themselves. Some of the questions can be answered by the teacher and some by the parent; but most of them are designed to be answered by the pupil.

The questions, therefore, are simple and the answers called for express the pupil's point of view. The teachers can translate that to the point of view of the sanitarian.

The state board furnishes the questions and answers. Dr. Hoag travels about the state visiting schools, installing the system and unraveling the snarls that arise in its operation.

Under the head of Sanitary Survey of Schools such simple questions are asked as:

"Is damp sweeping practiced? Are all windows thrown open at recess? Are parents notified of physical defects?"

Under the head of Personal Hygiene and Physical Condition are such simple questions as:

"How often do you have headache? Do you snore? Do you breathe through your mouth? How many colds have you had since school opened?"

Professor Wood of Teachers' College, Columbia University, says there is something wrong with 15,000,000 of the 20,000,000 American school children. Many of these troubles are in schools that cannot hope to have an elaborate school inspection. A large percentage of them the pupil can and will tell about in his own way if given a chance.

SAFEGUARDING THE HEALTH OF THE COUNTRY SCHOOL TEACHER

Will you write an article to help country school teachers living without city conveniences to keep well? E. P. B.

The above request is abstracted from a recent letter. In replying the emphasis will be put upon the "how" phase of the question. The questioner had in mind the teachers who teach in country and small town schools where the buildings are poorly equipped; where there are but few conveniences, comforts, or safeguards; where the equipment cannot be greatly changed; where the water comes from wells, the heat from stoves or hot air furnaces and where in bad weather the children bring muddy shoes and wet overclothes into the schoolrooms, and where the schools are not connected with sewer systems.

The question is: What can the teacher do to keep herself healthy?

I am starting with the assumption that the hundreds of thousands of teachers know that the percentage of ill health among teachers is somewhat high and want to do what they can to rectify it. They are asking the question "How?" That question we shall try to answer.

I should say that first in importance is nerves. In an article written

for that most intelligent group, the school teachers, it is not necessary to go into minor details. Nerves results from poor mental methods. The cure for nerves is mental training.

To every explosion there are two factors—the irritating party and the irritated party. The teacher works all day trying to control the irritating party. She will not succeed unless she devotes some part of the day to training the irritated party.

I have just read a booklet that I think would be of great aid to teachers. It is called "Calm Yourself." It is sane, good-natured, poised, clear, scientific, and simple; and it sells for 50 cents. Another excellent book is Arnold Bennett's "Human Machine." For years I have had benefit from Osler's "Essay on Equanimity."

Poise can only come as the result of training. Bennett sets aside a half-hour a day for this self-training. This is enough if the teacher will carry its influence on throughout the contacts of the working day.

We must not lose sight of the fact that the best training of the irritating factors is the influence of a poised, irritated factor. A teacher who has always been tired and cross and learns how to be tired and good-natured will find it much easier to control the tired and cross children.

The "how" of poise is a matter of training one's mind so that good mental habits replace the faulty ones. There is no other way. This should not prove difficult to mental trainers—school teachers.

The exceedingly hard days for the teacher and the pupils are the bilious days. Biliousness is usually due to constipation. Therefore, one of the "hows" is how to avoid constipation.

The teacher should keep a pitcher of water and a glass on her desk. She should drink from half a gallon to a gallon during the school day. It will be better if she makes no particular effort to keep the water cool. It should be taken in sips every few minutes during the day.

She should keep fruit on her desk and eat one or two pieces during the day. In the main the fruit to eat is apples, but these should be varied with pears, peaches, bananas, oranges, limes, turnips, carrots and radishes. The fruit should be washed, then wrapped in clean paper and thus kept in the desk. Some of it should be eaten unpeeled. Bananas, lemons, limes, and (for most people) oranges should be peeled. This should be supplemented by such a change in the food at home as will tend to prevent or overcome constipation.

It has been noticed that contagion is worse in the spring than in the fall. In large cities where they plat out diagrams of contagion they find that the curve starts low when the children come together in the fall, that it gradually rises through the winter and that it peaks in the spring.

With some forms of contagion this rule does not always hold true in the country schools. For instance, a country school may have a run of measles in the fall and be free in the spring. The reason is that country communities are commonly free from measles and when by accident the contagion gets in in the fall it spreads. The city harbors measles all the time and the law of growth is not subject to the same exceptions.

The reason for this gradual rise in the sickness line is that carriers of colds, pneumonia, diphtheria, scarlet fever and other forms of contagion

come into the schools. There is a gradual spread with a gradual rise in severe illnesses.

The point to it is that mild illnesses bear a relation to severe illnesses. Their relation to contagion is well proved. In fact, it is easy to demonstrate it in schools provided with nursing, inspection and laboratory service.

The teacher catches some disease from the students. The "how" of the situation is as follows: Let her keep her own record of the children's ills. In this record she should enter such minor iils as headaches, sore throats and colds. For this purpose she can devise her own blank. Possibly she will find it to her advantage to make use of the scheme of health survey of pupils got up by Dr. Hoag, blanks for which are on the market.

The teacher will not be highly susceptible to contagion. In this day practically all of the teachers worth saving are vaccinated and are, therefore, in no danger from smallpox. Most of them have had ordinary forms of contagion. Some have not.

Alertness will serve to protect the teacher and her school. In time she will be able to suspect from the record of colds scarlet fever or diphtheria; or from the record of diarrheas to uncover a chain of atypical typhoids.

Tuberculosis in children is rarely contagious. If it is open, it is harmless. If the child has discharging glands of the neck or a consumption with sputum there is some danger to the teacher. If such children remain in school the teacher must see that the sputum or pus is burned.

The schoolroom must be provided with a hygrometer. The usual form of hygrometer is also a thermometer. A record of the temperature must be kept. This record should show the temperature in different parts of the room, at different distances from the window and at different levels above the floor.

The temperature of the rooms should not go above 68°. This is easy enough if the floor is kept warm and the windows are tight. The usual complaint of cold is due to uneven temperature in the room—a temperature of 75° at the head level and of 65° at the feet level, a temperature of 80° around the stove and of 60° next the window.

If the school is in a town where there is electric current during the school hours electric fans will remedy this defect. The air next to the skin is about 90°; the air next to the window may be 55°. Obviously, then, in winter time the fans should not play directly on the people. They should play on the radiators or stove or the inside wall.

If fans are not possible what can be done? I am assuming that the heating system is in and cannot be changed. The windows must be periodically opened and the room blown out. It is better to keep the room at 55° to 60° even if the children must continuously wear their wraps than it is to keep the head in air at 75° and the feet at 65°.

If the teacher's feet are cold during the day let her provide herself with moccasins made of sheepskin tanned with the wool on, the wool on the inside. Such moccasins are on the market.

Let her keep the humidity about 50. This means about ten degrees difference between the readings of the wet and dry thermometer. This means frosted windows on a wintry day. There is no health in a school where the windows, if single, do not frost on a wintry day.

If the room is heated by a stove a large water pan on the top of the stove will furnish moisture enough. The pan must set flat enough on the stove to keep the water close to the boiling point. Gallons of water will be required, as one who watches the hygrometer will soon learn, and any arrangement that does not provide gallons to be evaporated will be ineffective. If the room is heated by hot air a water tank must be set in the hot air chamber above the dome of the firebox.

To keep down dust Miss Morris of the Louisiana Board of Health recommends "dustless sweepers, dust cloths wrung out of kerosene for each schoolroom and oiled floors."

Write to your state board of health about the water supply. Tell them the depth of the well; whether it is cemented or cased; how far away the well is from privies, the schoolhouse and other sources of soil pollution; the type of the soil and the direction of flow of ground water (if known); whether the water rises during rains and falls during drought; and the taste of the water. The state board will either examine the water or else it will tell you whether water from wells of the type of yours is safe or not.

Water used by a group, say the school children, to be safe must be purer than water used by a single family. If the water is unsafe let the teacher make it safe by (1) heat or by (2) chlorid of lime. Place the water in a kettle on the stove, bring the temperature to 160° and hold it around there for twenty minutes. Put it in a clean bucket and allow it to cool, the more quickly the better. Water heated in this way will contain no live typhoid or diarrhea germs and it will not be so flat as boiled water.

To sterilize water with lime: Have the druggist prepare a solution of chlorinated lime, one level teaspoonful to four cupfuls of water. Use lime from one-pound tin cans. Keep the bottles corked well. One teaspoonful of this solution added to a two-gallon bucket of water will sterilize it. The taste of chlorin will disappear after the water has stood twenty minutes.

For the ordinary school yard privy should be substituted the McCormack type recommended by the Kentucky Board of Health. This consists of an ordinary cheap, flyproof frame house. The contents go into an underground septic tank, 6′x5′x5′, and the run-off is through forty feet of unglazed tile. If the soil is a loam, a sand or a gravel this tile is laid underground. If the ground is clay the tile should come to the surface and the effluent should flow in contact with the air.

Recesses are good for children. This truth is molded into custom. The recesses are good for the teacher. Custom has not recognized this truth.

The teacher will do well to get a bit of fresh air at each recess period. For her short essay out of doors she will be better off if she does not wrap up too much. Warm covering for her hands, feet and head and the ordinary schoolroom clothes are about enough. In a few minutes her heat making apparatus will be equal to the strain.

A dozen deep breaths will serve to distribute the blood heat well and keep the skin warm. To move about briskly not only makes heat by burning up muscle but it distributes the heat to those parts of the body where cold is appreciated.

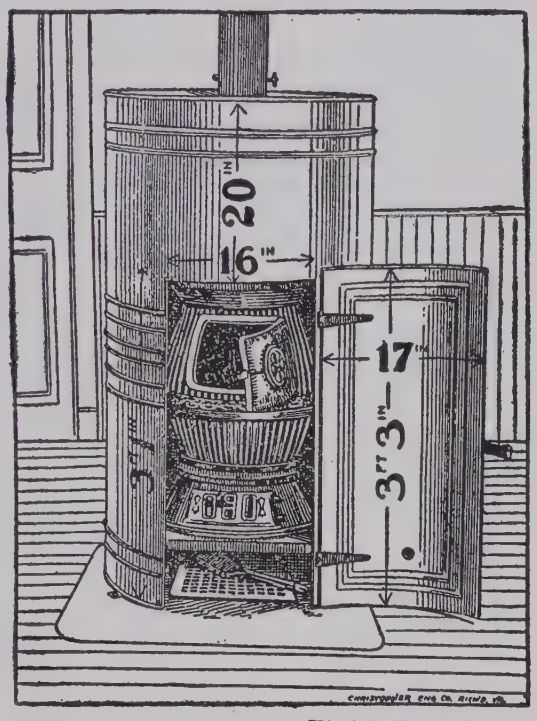
As the teacher's work is mental, unless systematic effort is made her muscles will grow flabby and soft. The powers of muscular conformation will

also suffer. Therefore, the wise teacher will devote some time each day to muscular exercise.

Some teachers will find a way to go into a cold room, preferably a heated room with wide open windows, and use some form of rubber cord or weight exercise for fifteen minutes a day. Those who cannot do this can exercise while teaching reading, taking part in ordinary conversation, or riding to and from school.

The muscles can be exercised by having them pull against each other quite as well as by having them pull against a weight. With the hand lying quietly in the lap every muscle of the arm, forearm, and hand can be made taut. Wherever in the body there is a group of muscles there is also an antagonizing group. When these two groups pull each against the other each is exercised and no change in posture results.

The teacher must go to sleep at night in a cold room. In order to be comfortable she must provide herself with high, warm slippers and a warm wrap. She must provide her bed with plenty of covering. But these requirements having been met, at least one window must be raised to the full. The room temperature in winter must be below 50°.



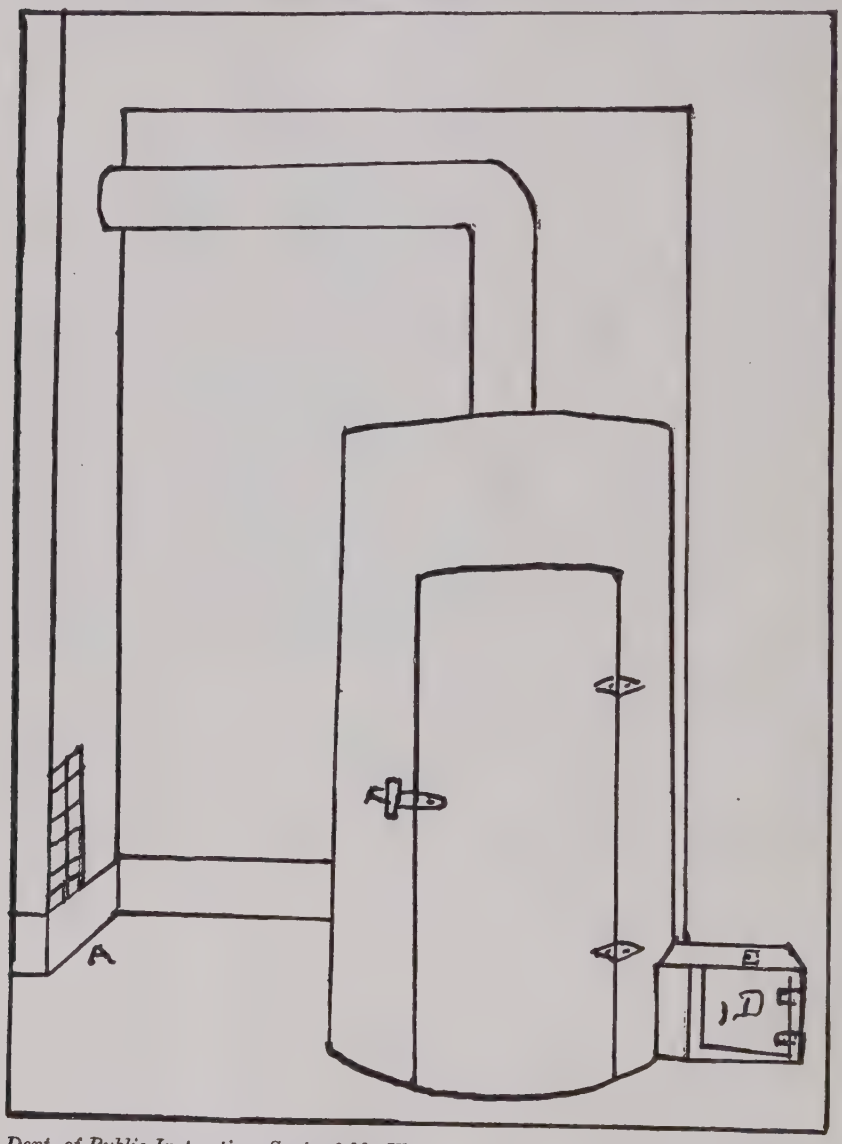
Virginia Health Bulletin.

FIG. 513.—JACKETED STOVE FOR HEATING AND VENTILATING ONE-ROOM SCHOOLS.

She must not neglect her minor ills. She must remember that colds are contagious. She must keep her distance from children who have contagion of one form or another. If, perchance, she contracts a cold she must not neglect it. And finally, let her have a care for the comfort of her feet and her eyes.

Heating Schoolrooms.—*W. B. writes: "Noticing a few days ago in your department some allusion to the heating of and fresh air in school buildings, I am impelled to inquire how long is required to empty an ordinary schoolroom of bad air—that is, how long should the half-dozen windows with which the average room is provided be kept open to allow the escape of all the bad air in it? Being a member of a school board with a number of buildings under its care, it often happens that this teacher or that has ideas concerning heating and ventilation that do not correspond with the ideas of janitors or of members of the board. Recently a teacher*

sent word to a member of the board that her schoolroom was too cold, and that unless something could be done at once school would have to be dismissed for the day. Investigation showed that the janitor had livened up



Dept. of Public Instruction, Springfield, Ill.

FIG. 514.—DOUBLE-FLUE CHIMNEY VENTILATION. A, foul air escape; E, fresh air intake; D, door which controls supply of air to the furnace.

his fire at 6 A.M., *leaving the windows open for fifteen minutes. Then the windows were closed, and by 8.30 the rooms were warm enough for the opening of school. But at the hour named the teacher arrived and immediately raised all the windows and left them open for fifteen or twenty*

minutes. When 9 o'clock arrived, the time for the opening of school, the rooms were still cold, it being an unusually cold and windy day. Then the complaint was made. The superintendent of schools, a member of the board, and a plumber appeared at the schoolhouse at about the same moment. The janitor was away on an errand. When the latter functionary returned, the three others had succeeded in raising the steam pressure in the boiler from five pounds to fifteen, with steam blowing out of the safety valve 'at the rate of forty miles an hour.' The janitor expostulated that it was not possible for him to heat the entire landscape surrounding the school building, but that if instructions were given teachers as to the length of time windows should be left open and some restriction made as to when they might be opened, he would still undertake to warm the buildings, if the supply of coal did not give out, and he would do it with five pounds of steam. Is it not a fact that the demand for fresh air which we read about so much, and some people talk about all the time, is overdone? People who know something about physics know that the tendency of heat to go upward will prevent the proper warming of a room if the windows are opened for fifteen minutes every half hour or so. If you can, please tell us how often and for how long a time windows should be opened in a room holding, say, forty pupils."

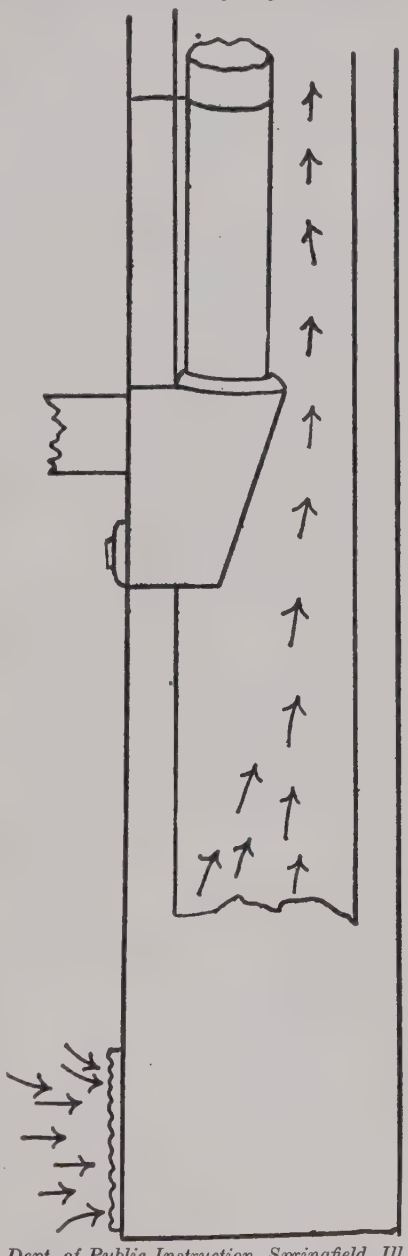


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FIG. 515.—SINGLE-FLUE VENTILATION.

REPLY.—The length of time will depend on the wind and the temperature. Three to five minutes three or four times a day is ample. It is best to have these periods come when the children are at recess.

The temperature when the children are in the room should be 68° F. When the children come in from play the temperature should be 60°; fifteen minutes later it should be 68°. Cold school rooms should have a temperature of 55°. The windows in such rooms should be wide open.

It is quite evident that in the school concerning which W. B. writes nobody has made any observations or given much thought to either heating or ventilating. In that, however, this school is not peculiar.

Help for Teacher's Nerves.—*E. writes: "How would you prevent nervous prostration, if forced to breathe continually the contaminated air of a public school kindergarten, and have the care of fifty children, mornings and afternoons? The ventilation of the schools is said to be 'perfect,' which is of course a fallacy. Mrs. Young forced the janitors to open the*

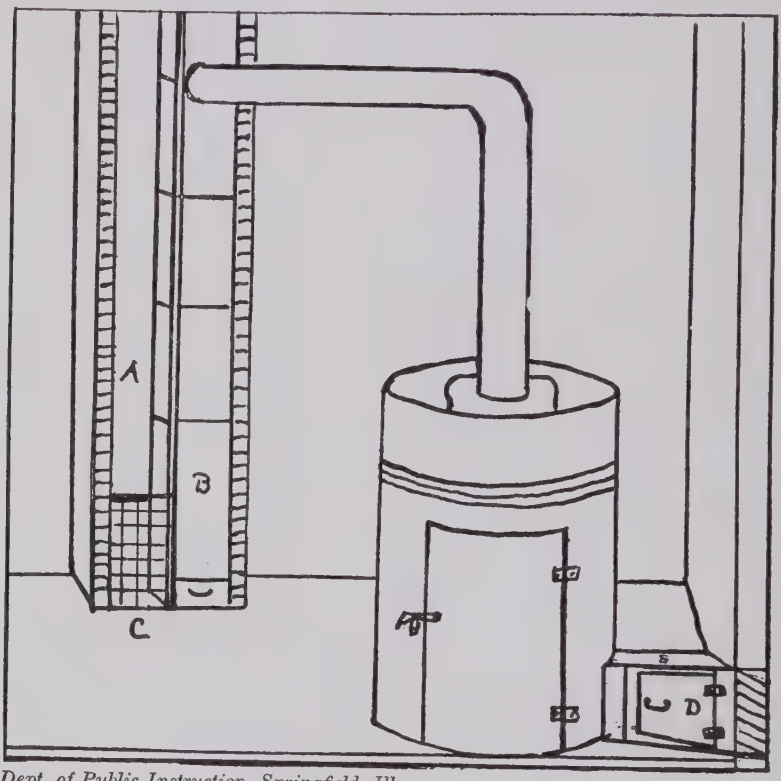

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FIG. 516.—CONSTRUCTION OF A DOUBLE-FLUE CHIMNEY. A, foul air flue; B, chimney tile; C, opening into foul air flue; D, door which controls supply of air to the furnace.

windows twice a day, but that is quite insufficient in a crowded room, and it only takes a few days or weeks to produce a perfect lassitude and weakness.

"Now I do not want to give up my profession, and I want some physical force. I never weigh more than 100 pounds and have continual difficulty in keeping built up. After a long vacation, I feel better for a little while, then begin the fight all over again. Can you recommend any course of treatment, or exercise, that might mitigate my trouble?"

REPLY.—The air of schoolrooms in Chicago and elsewhere is far from what it should be. The method is not perfect nor even approximately so. It is too warm, too dry, too dusty, too still and not freshened often enough.

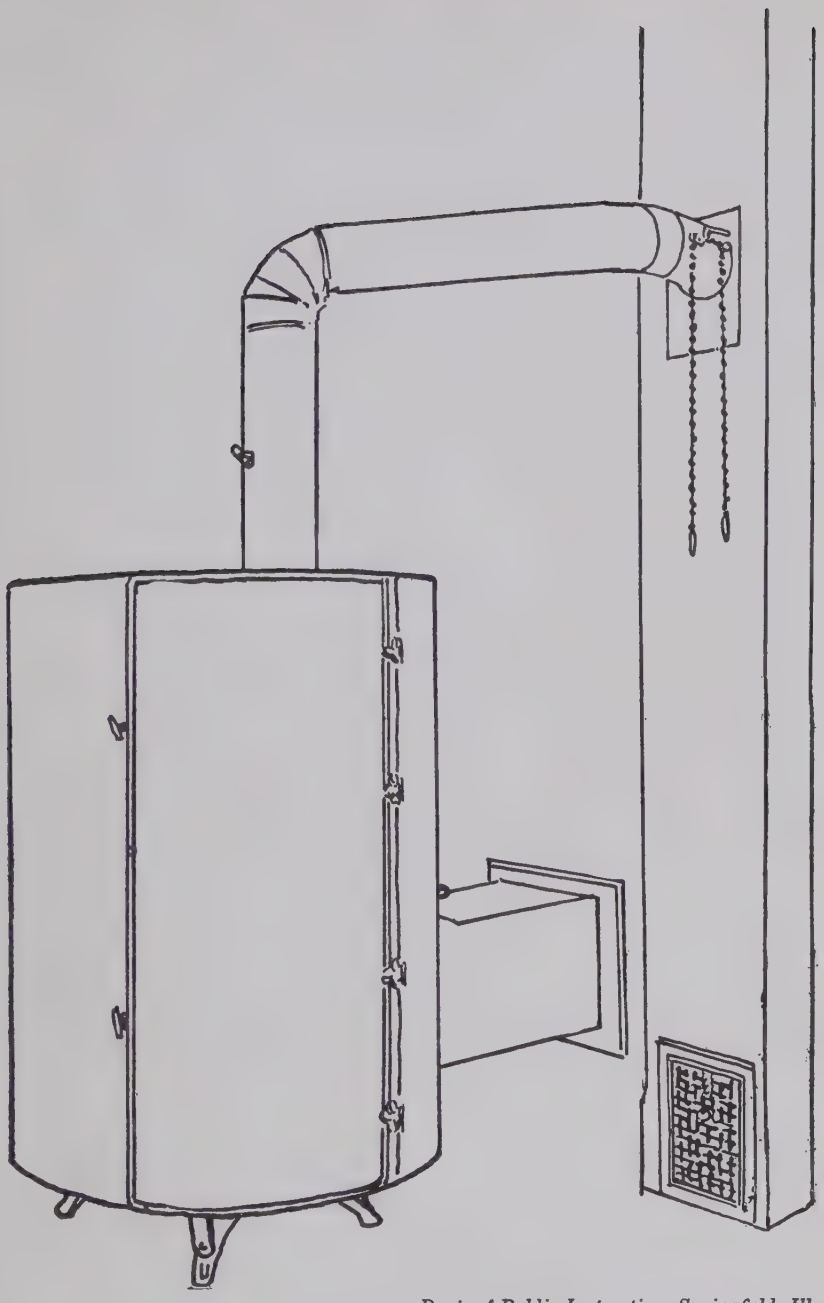

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FIG. 517.—HEATER WITH JACKET NOT REACHING THE FLOOR. This cut illustrates how the door controlling the supply of air to the furnace should be placed to take in the air from the outside, from within the room or from both. When the door is open it closes the outside opening and opens that from the inside. The air is then all taken from the room. When the door is closed the air is all taken from the outside. When the door is part way open, the air comes from both outside and inside.

You are evidently not in good physical condition and are justified in going to some trouble to get things bettered. We assume that you are anxious to teach in this climate. If you can get exchanged to an open-air school do so. If that is impossible try for a cold-room school.

If you must remain where you are proceed as follows: Buy a dependable thermometer. Buy a wet and dry bulb humidity measurer—a hygrometer. Keep an hourly record of the temperature in your schoolroom. Do not let it go over 65°. Take the temperature of the room at different places. Keep a record of the humidity. Keep this up to 50. Expose enough water around the room to keep the humidity up.

Open the schoolroom windows and blow out the room several times during each day. When the room begins to get close and stuffy give the children some kindergarten play and while they are moving about air out the room.

You are evidently undernourished. Eat all that you are now eating and add two glasses of buttermilk to each meal. When you begin to tire of this stop it and take a glass of sweet milk with each meal and one at bedtime. Drink a pint of cream a day as a further variation in your milk diet.

Finally you evidently need mental calm. You are probably a worrier. You need equanimity; Christian Science, mental science or the Emmanuel teachings will help you here.

Purpose of School Inspection.—*Mrs. J. S. G. writes: "1. Will you inform us just how medical inspection in schools should be conducted in order to be effective? How frequent should the inspection be? How thorough should it be? 2. Have those people who object to it any legal right to do so? Has the school board the right to enforce such people to submit to it? 3. How is it arranged in the Chicago schools? I live in a small town near Chicago, where we hope soon to establish medical inspection in our schools, and am anxious that it should be a success."*

Reply.—1. I cannot answer this question in the space at my disposal. Read Gulick and Ayres, Cornell or Hoag, or the Chicago health department report for 1911. Possibly you could get them from your public library.

2. School inspection is for two purposes: to exclude children bearing contagion from school and to discover physical defects. Sometimes the school inspection in operation in a town applies to the first of these, sometimes to both.

3. In the Chicago schools both forms of inspection are practiced.

Systematic Play for Both.—*Mrs. E. McC. writes: "My boy is nearly 10 years old, more than the average in height and weight, and in the fifth grade. He stoops over so much that his head seems to come from his chest. I am constantly reminding him of standing up straight, which he does for a moment and then forgets. Please advise me what to do for him, also about my daughter. She is 15 years old, but is always taken for 18 or 20. She has headaches almost all the time, and doctors claim they do not come from her eyes. She also suffers from extremely cold and wet feet, winter and summer, and her hands are always cold. Would woolen stockings help to keep her feet warm?"*

Reply.—1. Have your boy go to the nearest park or playground gymnasium and get the director to lay out some play and work for him. Even

if his spinal column naturally tilts forward proper play, persisted in, can straighten it a good deal.

2. As to the warm stockings and mitts—yes. Systematic play should help her too.

May Be Due to Dry Air.—*G. A. H. writes: "There is a rash or itch prevalent among school children in my vicinity that is quite distressing to the little folks, and even some of the larger ones have been slightly affected. There is hardly anything noticeable on the skin, not even redness. Sometimes a small red pimple is seen, something like scarlet fever rash, but does not make the shot-like feeling under the skin. The children do not itch so much in the morning or during the day, but at bedtime and afterwards they will scratch almost continually and wake themselves up. Their health is fine. The arms and legs seem most affected. Can you suggest a salve or liquid preparation that will relieve this condition, and also be inexpensive?"*

Reply.—There are two or three kinds of skin diseases which are commonly spread by school children. Control of these is one of the advantages gained from having school nurses.

G. A. H.'s description does not fit these. It is smallpox, not scarlet fever, which makes "a shot-like feeling under the skin." Nevertheless, this description does not read like scarlet fever.

My advice to you is to have the city physician exclude scarlet fever and the skin diseases frequently spread at schools. If it is not any of these then it is due to dry air in the schoolrooms.

It will get better as the rooms are better ventilated in April and will stop as the windows are opened in May.

The cure is to increase the humidity of the air in the school. Salves will not do the job.

Have Windows Opened.—*E. A. R. writes: "I am a high school girl, 15 years of age. Sometimes during the day my throat gets full of slime and I can hardly talk, at least not as I should talk. Is this catarrh? What ought I do to prevent it? Will you please tell me if I am small and thin for my age. I am 5 feet 2 inches tall and weigh 95 pounds."*

Reply.—I cannot tell why your throat gets full of slime. Stay in the open air all you can; get your schoolroom windows up during recess time; get them up on all warm days. If this does not relieve your huskiness have your throat examined. You are a little undersized.

School Session too Long.—*A. M. writes: "Will you please state your opinion of a high school session of four hours and three-quarters in forty-minute periods of recitation and study, with no break for lunch, gymnastics, or other form of relaxation?"*

Reply.—It is wrong from the health standpoint. Four hours and three-quarters of concentration is bad for the adolescent, both mentally and physically. It is bad pedagogically. The proper system provides for short study periods, with intervals of play and manual training—the Gary system.

Let Boy Remain in School.—*Anxious Mother writes: "I have a 13-year-old son attending private school where recently diphtheria has developed and they have had sixteen cases in quarantine, isolated of course.*

Two of these were from the hall my boy is in, using the same study hall and dormitory. They tell me they have quite a few cases of tonsillitis that are watched carefully and throats examined each morning to determine if they develop diphtheria germs. Antitoxin is administered if such is the case, and they are sent to the isolation hospital on the university grounds. In the event of a diagnosis of diphtheria the parents are notified. But should I wish to go into quarantine to be with my boy it would be forbidden, and no parent is allowed to be with a child during his isolation. They tell me the law forbids it. I do not wish to appear overanxious nor to interfere with my youngster's studies unless necessary for his good. I am really not thinking he will take diphtheria and would not consider taking him out of school on a chance of his developing it, except for the thought that were it to happen I should be denied going to him. They suggest, realizing my uneasiness, antitoxin being administered to him to eliminate the chance of his taking it, and tell me that should another case develop in the hall from which most of the cases came they would ask permission of the parents to administer antitoxin to every child in the hall. Will you tell me as a physician just what course you would take if you had a child situated as mine is? He is an only child and this is his first year away from home and diphtheria is the only child's disease through which I have not cared for him."

REPLY.—Leave the boy in school. Five hundred units of antitoxin would be entirely safe and would make the boy immune for a month. This is probably unnecessary but it is advised in part to ease your mind. The school is proceeding most wisely and will no doubt hold the epidemic down. The only additional procedure to be advised is to culture every sore throat in the hall from which the cases came.

As you do not mention the state I can not say whether it is illegal or not for you to go into quarantine with the boy. It would not be in Illinois. In fact, parents are sometimes allowed to go with their children to the diphtheria hospital in Chicago.

When antitoxin has been used and proper precautions are taken the risk is slight. This privilege occasionally helps the child. Its chief function is to calm the parents.

Let Him Play with Children.—*Mrs. M. A. L. writes: "My boy, nearly 5 years old, has always been well. He is large and strong, and bright, but seems extremely nervous. It appears to be more imagination than nervousness. For instance, he will be playing out in the yard, perfectly contented, when all of a sudden he will begin to cry. When I ask him the reason it will be some foolish fear. He is afraid the wind will blow papa away; that the house will catch fire, or something equally foolish. He sleeps well from 7 P. M. till 5.30 A. M., but tells me of the strangest dreams he has had. He is alone a good deal, as I am busy with the baby. But he has a big yard to play in and a playhouse. I never allow him to play with other children. 1. Do you think I ought to let him run the streets with the other boys? He seems happy and contented till he gets a notion like those mentioned, then he commences to cry. What treatment do you suggest? 2. Would circumcision help? 3. Is it dangerous? 4. What effect will it have if I don't have it done (in after life, I mean)?"*

REPLY.—1. This child's mentality and spirit require the best of training. Left to himself he will certainly grow up a confirmed neurasthenic. As soon as he is old enough get him in a kindergarten run by teachers who

know something about the psychology of children. Be extremely careful in home training. Try to establish poise and balance and banish fear. Have him play with wholesome children as much as possible. Encourage him to compete in games.

2 and 3. No.

4. None.

School Inspection Barred.—*H. J. writes: "1. Is physical examination of school children in cities of 7,000 or 8,000 population practicable? 2. Do many such towns have anything of the kind? I am led to ask these questions by the attitude of the school board of my city toward any form of medical inspection. Several months ago a woman member of the board presented a resolution providing for inspection, but it was buried in committee, and all efforts to revive it have been futile. Later the same member offered a plan for medical examination that would be without cost to the board. (Every physician in the city had promised to give some time to the work, without pay.) This also was rejected. Now, only recently the women's club of the city, having made some money by the sale of tuberculosis seals at Christmas time, offered to pay the expenses of a visiting nurse for a month, planning for her to give talks on hygiene to the children and their mothers. The offer was refused point blank, and the women were told to 'mind their own business, and not butt in.' 3. What possible objection can there be to this work? 4. Does it scare the children and their parents? Is it a kind of slumming project—looking after the children of the 'common people'?"*

REPLY.—1. Yes.

2. No.

3. School inspection is for two purposes: (a) To control contagion; (b) to increase the learning capacity of the average student. That it is a good investment every one with experience knows. Those without experience can know it from reading Gulick or Cornell. Nevertheless school inspection is objected to because it costs money. There is no other objection worth considering.

4. No.

CHAPTER LXV

Sex Organs of Woman

THE FEMALE SEX ORGANS

The essential sex cell in the female is the ovum. It is the cell which, when properly fertilized, develops into the child. The organ which produces these cells is called the ovary. The ovary, therefore, is the essential sex organ in the female. The other female sex organs exist for the purpose of serving the ovum.

The ovaries, two in number, are located deep in the pelvis on each side of the uterus. When the female child is born her ovaries are filled with immature ova. These lie quietly in the ovaries until puberty is approaching. Beginning with puberty and from that time until change of life, from time to time, the ovaries discharge an ovum or more than one, the process being known as ovulation. In some girls a few ova mature and are discharged before puberty and in some women a few are discharged after the change of life but these are the exceptions. The rule is that the discharge of ova begins at puberty and stops at the menopause.

MENSTRUATION

At twenty-eight-day intervals (in women between puberty and the menopause) menstruation appears. At this time the blood vessels of the uterus fill with blood and the membranes lining the uterus and the fallopian tubes swell. Some of the blood oozes from the congested vessels and finds its way

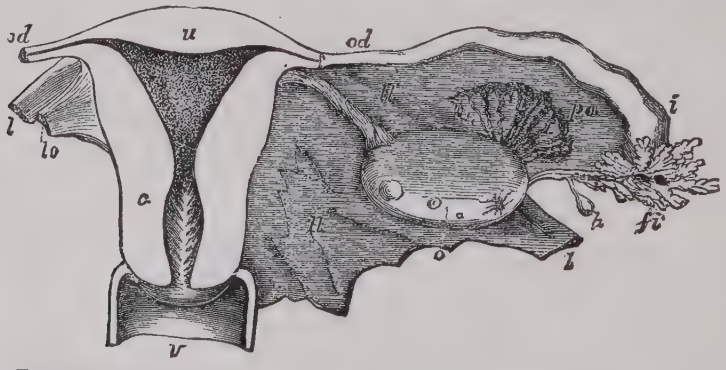

FIG. 518.—FEMALE REPRODUCTIVE ORGANS (two-thirds the natural size), AS SEEN FROM BEHIND. *u*, upper part, and *c*, neck of uterus (in section); *v*, upper part of vagina; *od*, fallopian tubes (left one cut off) opening into cavity of abdomen at *fi*; *o*, right ovary; *po*, *h*, accessory ovarian structures; *l*, *ll*, *lo*, supporting ligaments.

into the interior of the uterus. This blood, with a few of the cells lining the uterus, is what is known as the menstrual fluid.

The amount of fluid lost at each menstrual epoch varies from two to fourteen ounces. The average duration of the flow is about three days.

At the time of menstruation the mammary glands or breasts enlarge slightly, there is a feeling of heaviness in the pelvis, there may be a little aching in the hips, there is some congestion of the female generative organs and in most cases an ovum is discharged from the ovary and slowly makes its way down a fallopian tube, thence into the uterus.

While ovulation and menstruation usually go hand in hand they do not always do so. As has already been stated, in some cases ovulation takes place before puberty; in other cases, it occurs after the menopause. Sometimes an ovum is discharged between the menstrual periods.

Therefore, all that we can say is that there is some relation between ovulation and menstruation. Ovulation is one of the determining factors in menstruation but it is not the only one and just how it acts, or why, no one knows.

NORMAL MENSTRUATION

In the average woman menstruation appears once in every twenty-eight days. However there are many exceptions. Some women menstruate once a month; others once in three weeks and others once in five weeks. If a woman is free from other symptoms the fact that she menstruates at too short an interval, too long an interval, or even at irregular intervals, need occasion no alarm.

As the time for menstruation approaches a woman becomes somewhat nervous, her breasts swell somewhat, she has a feeling of heaviness or bearing down in her pelvis and perhaps she notices that a slight discharge precedes the flow. None of these symptoms means that there is any disease present. Any one of them can be moderately exaggerated without indicating the existence of any condition which calls for investigation.

The flow varies in amount. Women generally describe it in terms of napkins. But that is not very dependable since one woman will wear a napkin until it is thoroughly saturated while another will change as soon as her napkins become slightly soiled. To put it differently, the amount of flow varies from two to fourteen ounces. Or to state it another way the flow is free during from two to seven days. These wide variations mean that there is nothing that is very fixed about the amount or the duration of menstruation. It does not matter so much as women think. One often hears such prophecies as these: "She does not menstruate freely enough; that cannot be good for her;" or "She menstruates too freely (or too long); that is bound to be pulling her down." The fact is that these prophecies, predictions and plain statements of fear are not justified. A woman's menstrual habit is normal to her. In nine cases out of ten she is too free or not free enough, as compared with the average woman, because that is the natural way for her.

Medicines to make her flow more freely or less freely, as the case may be, do no good and it is well for the woman that they do not. It is best for the woman that she continue her menstrual habit even though she flows

less freely, or more freely, for a shorter time or for a longer time, than some other woman.

At the end usually of three days the amount of flow begins to lessen. The discharge of blood stops and a light discharge of mucus replaces it. Then all flow stops. Such is normal menstruation.

Biologically, it is not a well-established function. No animal lower than a monkey menstruates. In monkeys the function scarcely exists. In female savages, menstruation, Reed tells us, is by no means well established. Among highly civilized races it is most prominent but not even in them does menstruation pursue a fixed course. *Therefore, an individual woman can menstruate differently as to amount, time and symptoms from the average woman without the difference indicating that she is abnormal.*

HYGIENE OF MENSTRUATION

It is well to begin the menstrual period with the bowels open. Probably no cause of menstrual disturbance is as productive of symptoms as is constipation. The bowels should be in order all the time but if the menstrual period finds the large intestine full a saline purge or an enema is justified.

Not only should the napkins be changed as frequently as cleanliness may demand but there should be no hesitation in taking local neutral baths (neither hot nor cold). In fact there is no harm in taking a general neutral bath, a neutral foot bath or a neutral sitz bath if it is desired.

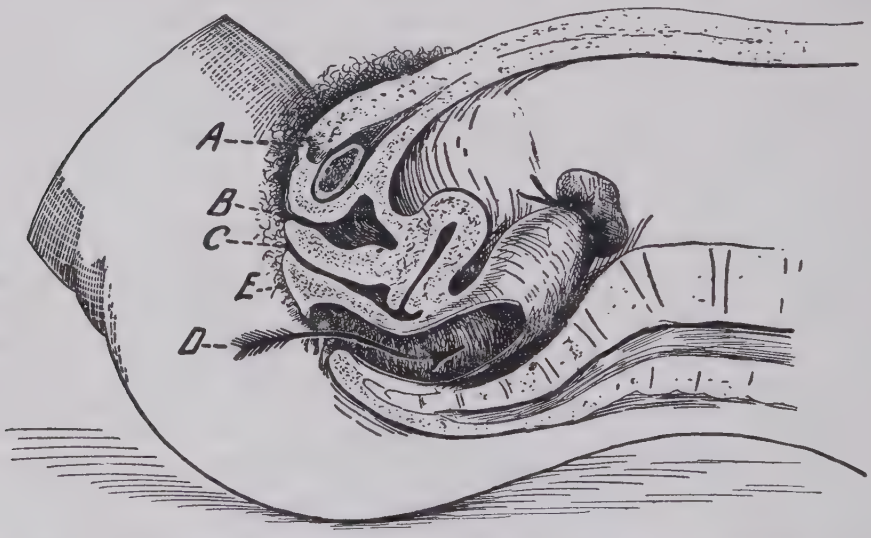

FIG. 519.—SECTION OF FEMALE PELVIS SHOWING LOCATION OF ORGANS. A, the pubic bone; B, the bladder; C, the vagina; D, the rectum; E, the perineum.

If there has been exposure to cold or the clothes have been wet by rain it is advisable to take a hot mustard foot bath (a tablespoonful of ground mustard to two gallons of water) or a general warm bath, and then go to bed and remain there for several hours. Cold baths and cold plunges during menstruation are not advisable.

The amount of exercise taken during menstruation need not be less nor more than is the daily habit.

As soon as menstruation has stopped a local bath should be taken. It is the custom of married women to take a cleansing douche of tepid water at the end of menstruation. This custom is all right. Probably it is not best for the unmarried to follow this custom.

SCANTY MENSTRUATION

Within a year after puberty a woman establishes her menstrual habit. She may menstruate but very little but that is her habit and it is, therefore, not significant of any disease.

But there are certain conditions which produce scanty menstruation and which call for some attention.

Overfat women do not menstruate freely. Sometimes they do not menstruate at all. Fat women are disposed to be sterile, but there are exceptions. Occasionally, a woman who does not menstruate on account of obesity or who menstruates but little will conceive. Scanty menstruation in obesity is due to lack of balance in the secretions of the ductless glands.

Chlorotic women are very apt to have scanty menstruation. One theory is that this is due directly to the poverty of the blood. The other is that it is due directly to poverty of ovarian secretion—poverty of the blood being an indirect cause. In chlorosis menstruation is an excellent index of the state of the blood. A return of menstruation indicates improvement and *vice versa.*

In various profoundly disabling diseases, scant menstruation is a symptom of value, for instance, in advanced tuberculosis, in cancer and in other diseases which profoundly depress vitality.

Scanty menstruation in one accustomed to menstruate freely is a symptom of some form of constitutional disease. It calls for a careful thorough examination of the blood and other organs.

AMENORRHEA OR ABSENCE OF MENSTRUATION

The rule is that menstruation occurs at intervals from puberty to the menopause except during pregnancy. Pregnancy, therefore, is the most frequent cause of absence of menstruation. It is, however, not the only cause. Occasionally, we find a woman who never menstruates at all. In some cases such women are otherwise normal. Some of them have borne children. Not infrequently a woman who has a child at breast and who has not recommenced to menstruate will become pregnant. These two groups of cases show that ovulation may take place without menstruation.

In some cases of absence of menstruation the trouble is the result of tumors or other abnormalities in the pelvis.

In amenorrhea or absence of menstruation a thorough examination of the female organs is advisable. In scanty menstruation it is not, unless there is some special indication.

That worry can prevent menstruation is a well-established fact. The professional abortionists gain their riches from women in whom menstruation has been stopped by fear. A woman is afraid that she is pregnant.

Her fear possesses her. The day for menstruation comes. No flow appears. She goes to an abortionist or she buys some tansy pills or cotton root or ergot. She takes a dose and, becoming easy in her mind, the flow appears. She gives the drug credit. The credit is due to the fact that her fears have been allayed.

MENORRHAGIA AND METRORRHAGIA

Discharge of blood between menstrual periods is called metrorrhagia. An excessive flow is called menorrhagia.

Hemorrhage from the uterus not due to menstruation should always call for an examination. *If a woman past the menopause has uterine hemorrhages ever so slight she should be examined at once.* In all probability she has cancer and her only hope of life lies in early diagnosis. Next in the line of probabilities is fibroma. A fibroma which causes hemorrhage in a woman past the menopause is not to be neglected.

Metrorrhagia in a woman before the menopause is very apt to be due to an incomplete abortion. The second most frequent cause is uterine tumor—possibly a rather small one. The third most frequent cause is a moderate degree of anemia.

Therefore, a woman who has a hemorrhage from the uterus between periods should have an examination. The female organs should be examined for evidence of abortion and for tumors. The blood is to be examined for anemia.

In a case of menorrhagia the first point to decide is whether or not the free flow of blood is the woman's habit. If it be decided that it is not her habit and that something is to be done for it the first step is to find out the cause. Among the causes are: (1) tumors of the uterus; (2) tumors of some other pelvic organ; (3) inflammations of the uterus or tubes; (4) failure of the uterus to reach the proper size after pregnancy—subinvolution; (5) constipation; (6) malaria; (7) anemia; (8) various diseases causing moderate debility; (9) abdominal tumor; (10) violent emotions.

The probability is that a given case of menorrhagia is due to some tumor in the pelvis or other disease of the female organs. Therefore, the indication is to have a thorough examination of the pelvis. If the cause is not in the pelvis the most likely cause is distension of the lower bowel with feces. Next in frequency as a cause is anemia of moderate grade.

Many cases of menorrhagia have been operated on locally and the credit for cure given the operation, when in reality it was due to the thorough cleaning out of the bowels which the woman had while under treatment, or the iron and arsenic, cacodylate, or quinin given after the operation.

To check a flow which is regarded as much too free quiet in bed with the head lowered and an ice pack over the lower abdomen is advised. A physician may give vaginal injections of ice water but the patient must not do this except under advice.

For the cure of menorrhagia local treatment should be given where it is needed. If constipation is the cause it must be remedied. If malaria, quinin is to be given. If anemia, iron, arsenic or cacodylate of soda. Ergot and the multitude of patent medicines for female irregularities are useless, or worse than useless.

DYSMENORRHEA

Dr. Kristine Mann says that "cramps" is the most frequent complaint of women who seek relief in the rest rooms of large department stores. I am sure that her observation is correct and that among women who do housework, stenography, clerical work and light work of that type, cramps is very much the most frequent symptom complained of. Every day the keeper of every rest room is called upon to do something for cramps. The remedy commonly given is whisky.

Many female whisky users claim that they got the habit from taking whisky for cramps.

Another rough and ready remedy for cramps is paregoric or laudanum. This is the origin of some cases of opium habit.

Dysmenorrhea is important from more than one standpoint. The term means difficult menstruation. This is usually construed as meaning pain during menstruation. The pain may be any of several varieties. A frequent statement is that the sensation is one of cramping in the uterus, the pain being very similar to that of cramping in the intestines. The cause of this variety of pain is spasmodic contraction of the muscles of the uterus.

FIG. 520.—PELVIC HEMATOMA. Uterus pushed forward somewhat by blood clot lying in front of rectum. (C. F. Adams, "The Post Graduate".)

On the other hand, what some women mean by dysmenorrhea is merely an exaggeration of the heaviness and discomfort in the pelvis, some of which is felt during menstruation by every woman. Neurasthenic, hysteric or self-centered women are liable to consider and to speak of the sensation as dysmenorrhea or cramps.

For the relief of dysmenorrhea the best treatment is a hot foot bath and local applications of heat or cold. If the flow is scanty apply an icebag to the back low down. If too free a hot bag to the same point. If necessary give a dose of acetanilid or phenacetin (5 grains) internally or a hot drink containing some aromatic such as aromatic spirits of ammonia, or camphor. None of this group of remedies is better than 10 grains of camphor dissolved in cinnamon mucilage water. This can be repeated in an hour. Dr. Mann gives 30 drops of fluid extract of viburnum. *Neither opium nor whisky should be taken. Whisky does not relieve the pain except in the sense that it intoxicates and thus makes the woman indifferent to pain.*

In some cases the pain can be prevented by 10 grains of salicylate of soda taken three times a day for a week before the period is due.

In most cases the sufferer should consult a physician with a view to a thorough pelvic and general examination to be followed by treatment directed against whatever condition is found to be causing the symptom—for dysmenorrhea is only a symptom.

DIAGNOSING THE CAUSE OF STERILITY

Duncan tells us that about one marriage out of six is without issue. Seven per cent of the women who marry when between 15 and 19 years of age are sterile. Those women who marry when between 20 and 24 years of age are the most fertile. From the age of 24 the percentage of sterility gradually rises until in women who marry at the age of 50 it reaches about 100 per cent.

Practically speaking, if no children are born within three years after marriage and no effort to prevent conception has been made the marriage will be without issue.

Lespinasse tells us that 7 per cent of fertile couples have their first child three years or more after marriage. Among wives between 25 and 39 years of age this percentage rises to 15.6.

If a marriage is without issue the fault lies with the husband or wife. The only way to discover which is at fault is to make a careful inquiry. Dr. Lespinasse starts with the husband. He first wants to know whether the husband has had syphilis, gonorrhea, mumps, tuberculosis or profound anemia and what injuries he has had. Next, he is carefully examined. This examination should include necessary microscopic examinations.

If the husband is found capable of producing children the inquiry is extended to the wife. Is she fat? Fat women are often sterile. Has she anemia? Is she soft and flabby? Has she goiter, or too little thyroid, or too little pituitary secretion? Certain tests show whether there is too little pituitary or thyroid secretion. Has she had gonorrhea or syphilis?

If the trouble is not with the husband, and the wife is normal in the above particulars, he proceeds to make such other physical examinations and microscopic examinations as are indicated.

The responsibility for the difficulty can be located in nearly every case. In a very large proportion of cases it can be remedied. Some doctors make the diagnosing of the causes of sterility a specialty.

Baths During Menstruation.—*B. B. writes: "Will you kindly advise me regarding baths during the period of menstruation? I am used to taking a warm bath every night and a cold plunge each morning. During this period I do without the morning bath, but I take the warm bath at night as usual. I am told that this is a very unwise habit, but I do not know how to do without it.*

"I am thirty-nine, seldom actually ill, but am not strong—that is, I tire very easily. I do clerical work and without the stimulus of a cold bath I do not feel equal to my work."

REPLY.—It is not wise to take a cold plunge during menstruation. The warm bath at night is all right.

Change of Life.—*G. writes: "I am 53 years old and for the last few months I have hot flushes. At times they make me quite faint. I am continually tired and my legs at times are very stiff and painful. Can you advise me what to do? Do you consider this at all serious?"*

REPLY.—You are passing through the change of life. Be calm and everything will work out all right.

Menorrhagia.—*P. S. D. writes: "Will you please advise the proper way of living for a woman suffering from excessive menstruation who is pale, frequently subject to headaches, lacking in endurance and, as a consequence, does not take much outdoor exercise?"*

Reply.—I think she should consult a physician. He will probably examine her blood and find her anemic. He will probably find her flabby. In the event that he finds her anemic and flabby he will prescribe a tonic of cacodylate of soda, arsenic, or iron, and tell her that if she wants to get well she must get more out-of-door exercise, eat more vegetables and fruit, drink more water and take less headache medicine.

Amenorrhea.—*A. B. C. writes: "1. Can a woman of 40 who has not menstruated for two years become pregnant? 2. Could she consider that she has passed the menopause? There have been none of the usual symptoms except some nervousness."*

Reply.—1. Possibly. 2. No.

Too Young for Change of Life.—*Mrs. W. M. G. writes: "I am a married woman of 38 and would like to know if the fact that I have missed a period proves I am pregnant or can I be starting the change? I am in good health apparently but have lacerations unattended to."*

Reply.—You are too young for the change of life. Missing one period is not sufficient basis for a diagnosis of pregnancy.

Normal Menstruation.—*A. P. writes: "I am an orphan girl 15 years of age. For the past week I have soiled my clothes with blood. Could you tell me a remedy for such a thing?"*

Reply.—You are menstruating. Girls of your age, and older, menstruate every four weeks. It is normal. That is the way nature works in women. In your body there are two glands called ovaries. These form cells called ova. About once a month one of these ova is discharged from an ovary. Leading from each of your ovaries there is a tube called the fallopian tube. The ova travel down this tube to another tube called the womb or uterus. Once every four weeks some blood oozes into the womb and fallopian tubes and then flows to the outside. That discharge of blood is called menstruation. After a few days it stops of itself. During this time you must keep yourself clean and protect your clothing by napkins.

Can you get your teacher, some relative or some other good woman to tell you all about your sex organs and how to take care of yourself? There are other questions that you will want to ask and other information that you will need.

Leukorrhea.—*S. D. C. writes: "Will you kindly indicate the course for a girl of 17 to pursue having constant discharge from ovaries for nearly a year? At times very acute pain and increased discharge. Is it possible for treatments to restore? Must the ovary be removed? General health excellent. Want no examination until condition in a general way is understood."*

Reply.—You have leukorrhea, usually the result of infection. If a general tonic and hygienic living does not cure you in six months, a pelvic examination should be made.

Very Scanty Menstruation.—*T. M. T. writes: "I am a girl 16 years of age and would like to have some advice. I had my menses when 13½*

years of age and since that time have received them at intervals of from four to seven months and then only for one day. Please tell me what to do."

REPLY.—I presume you have no other symptoms since you mention none. I presume your general health is good. Probably, therefore, the habit described does not mean that you have much trouble or that treatment will change matters much. However, my advice is that you see a physician, preferably a woman. A blood examination may show that you need a tonic. Some local condition needing treatment may be found.

Leukorrhea.—*M. S. writes: "1. I have had leukorrhea for several years. Have taken quite a lot of aletris cordial without favorable results. Is that usually a cure and would you advise me to keep it up? 2. Does leukorrhea cause weak spells? 3. If leukorrhea is allowed to run on what will be the result?"*

REPLY.—1. No. 2. Weak spells may be one result of leukorrhea. 3. Among other results there may be peritonitis or pus tubes. You should see a physician. It is possible that a tonic and leading a more hygienic life may cure you, or you may need some sort of operation or local treatment.

Can Ride Horseback During Menstruation.—*A. H. writes: "Kindly advise me whether it is harmful to ride horseback during the menstrual period."*

REPLY.—No.

Scanty Menstruation Not a Sign of Pregnancy.—*A. B. Z. writes: "Could it be possible for a woman to be pregnant and her menses come regularly, but not so plentifully, for four months, or is it just shortage of blood?"*

REPLY.—I do not think you are pregnant.

Amenorrhea.—*Mrs. D. M. B. writes: "Will you kindly inform me of the seriousness of the condition of a young girl of twenty-one years of age who has not menstruated for over four months? She passes an albuminous substance in her urine, has an enormous appetite and is troubled with constipation. She has lost weight in past year but has suffered no pain or headaches."*

REPLY.—I think she should see a physician. Her constipation needs attention. Probably she needs a tonic.

Complete Recovery After Severe Operation.—*S. G. R. writes: "A woman nearly forty years of age wants to know your opinion. She has had her appendix, right ovary and womb removed. Can she expect ever to be well and strong, to do housework as other women? She is extremely nervous and has a floating kidney. Can she expect to live as many years as though this had never been?"*

REPLY.—I cannot answer the question as to you because I do not know you. I can only make some general statements as to women in general. The removal of the appendix, right ovary and womb very definitely disturbs the relations of the nerves, vessels and all other structures in the pelvis. Therefore, considerable time for readjustment is required. In time complete readjustment can be expected.

Is Pregnancy Safe?—*J. B. writes: "Would you allow a pregnancy in a woman 20 years of age with a urine showing a trace of albumin and a few hyaline casts? There is no previous history such as scarlet fever, etc. It is not Bright's as there are no symptoms, no swellings; heart is normal in size and sounds as attested by a physician. Blood pressure is normal also."*

Reply.—If the woman will be carefully watched over and if she will lead a thoroughly hygienic life she should pass through pregnancy with reasonable safety.

When Can Pregnancy Be Diagnosed?—*Mrs. E. R. writes: "1. Will you please tell me how soon a physician can tell if a woman is pregnant? 2. Can he tell if she is, at two months and a half along, by examining the womb?"*

Reply.—1. By an Abderhalden, and sometimes by other examination, in the first month.

2. Yes.

Children Desired.—*C. W. C. writes: "I write to ask you a question the answer to which I feel sure will be of great interest to many others as well as to myself. I have been married over a year now and, although my wife and I are both anxious for children, we have thus far been completely disappointed. We are both wonderfully healthy to all outward appearances and cannot understand what is the matter. Under these circumstances is there reason to believe that there is something ailing? Should either or both of us consult a physician? Is there reason to believe that some defect exists which prevents one of us from having offspring? Or can we hope that in the natural course of events children will yet come?"*

Reply.—If, at the end of three years, you have no children you can be reasonably certain that your marriage will be without issue unless you have something done. At that time have a physician make a proper examination of you. If you are all right, an examination of your wife should be made.

There are a few physicians who specialize in this branch.

Phantom Tumor.—*E. M. D. writes: "Will you kindly tell me something about phantom tumors? What causes them? What are the symptoms? And do they leave any ill effects behind?*

"I have been troubled with signs of pregnancy. About the third or fourth month my abdomen will enlarge, then all of a sudden it ends. During this time I menstruate very freely and have great pain, otherwise the signs of pregnancy are almost all there. This has happened to me three times. The doctor laughs and says they are phantom tumors. That is all he will tell me."

Reply.—In phantom tumor the woman persuades herself that she is pregnant. The abdomen enlarges and she has feelings which she interprets as movement of the child, pressure of the child on the bladder and as other indications of pregnancy. A careful physical examination shows that pregnancy is not present. The condition is an illustration of what the mind can do. Also of what it cannot do, for examination not only shows that no pregnancy is present but also shows that there was no evidence that should have been interpreted as pregnancy.

An Old Husband and a Younger Wife.—*L. L. L. writes: "1. A woman of thirty is married to a man past sixty years of age—both perfectly healthy. Is she likely to enjoy the blessings of motherhood? 2. If so, are the children likely to be weaker, either physically or mentally, than children born to parents who are nearer of an age?"*

REPLY.—1. Yes. 2. No.

Shall Corsets Be Worn During Pregnancy?—*Mrs. G. S. P. writes: "I should like your opinion in regard to a point on which I find that women and physicians with whom I talk and books that I read differ greatly. The point is this—should a pregnant woman wear corsets? By some I am told that to support the abdomen is to weaken the muscles which normally should support the uterus and its contents, while others say that to go without corsets when one is used to them is apt to cause backache and will certainly make the abdomen sag permanently. Now, if a woman is anxious to do the best thing for both her child and herself, would you advise her to wear or not to wear a maternity corset throughout her pregnancy?"*

REPLY.—A woman who has been accustomed to corsets should wear a maternity corset during pregnancy.

What is Safe for a Pregnant Woman?—*R. L. M. writes: "1. Is a maternity corset absolutely safe to wear during pregnancy? 2. Is sewing on a machine harmful for a pregnant woman? 3. Is it best for her to read a book on care during pregnancy or is it unnecessary?"*

REPLY.—1. Yes.
2. No, unless work is excessive.
3. It is best, decidedly so.

Shall a Woman 42 Marry?—*Miss W. T. K. writes: "A woman of 42, fair health but nervous temperament, never married, contemplates marriage.*

"1. Is it advisable?
"2. Is she liable to become pregnant?
"3. Would not childbirth likely be fatal (no sign of menopause)?"

REPLY.—1. Yes.
2. Possible but not probable.
3. Not necessarily.

Childbearing and Diseased Ovaries.—*A. V. L. E. writes: "Could a person, whose ovaries were so badly diseased that it is necessary to remove both of them now, have had a perfectly healthy child eight months ago?"*

REPLY.—Yes.

Shall She Marry?—*X. Y. Z. writes: "Through ignorance, while a child, I was addicted to that awful habit, self-abuse, but on getting older, about 16 years, I tried and succeeded in breaking myself of this habit.*

"Now, Doctor, what I want to know is will this in any way affect the future generation should I get married? I am now a young woman of 21 and adore children but, if there is any possibility of disastrous results, I will immediately give up all hope of marriage."

REPLY.—It will not.

Care During Pregnancy.—*Mrs. R. D. writes: "Will you please answer the following questions: 1. Can a woman that is pregnant sew on the machine without harm to all concerned? 2. If a woman in that condition catches a very bad cold will she keep that cough and cold till after confinement? 3. Is there any danger of having a hemorrhage when coughing a great deal? 4. Is there any danger of having a miscarriage or hemorrhage when riding in an automobile across very rough roads?"*

REPLY.—1. Yes.
2. No.
3 and 4. The danger is not great.

Consult a Physician at Six Months' Pregnancy.—*R. G. R. writes: "My wife has been pregnant for about two months. She feels well in every way. At what month should we consult a physician?"*

REPLY.—It would be safer to consult one at three months. However, at six months would probably be safe enough in a case where everything is going nicely.

Ergot Will Not Cause Miscarriage.—*Mrs. R. D. writes: "Will you please answer the following: 1. From what is ergot made or obtained? 2. What amount is necessary to cause miscarriage? 3. Is it a poison? That is, can a sufficiently large dose be taken to cause death? 4. I read in a book published by a Dr. Hollick in 1850 that it is an absolute impossibility for conception to take place after 16 days after the ceasing of the menstruation period. Do you agree?"*

REPLY.—1. A fungous growth on rye.
2. No amount short of a very poisonous, probably fatal, dose will cause miscarriage.
3. It is.
4. While not absolutely impossible it is improbable.

To Overcome Sterility.—*Mrs. M. C. D. writes: "1. I am 30, have been married three years but am very anxious for a child. I have been examined by three different physicians who have said I had no 'female disorders.' I am healthy and never suffer with pains of any kind. Before matrimony, my husband was examined and found O. K. What is the next step you recommend? 2. Can you suggest any tonic which might help me? I know very little about medicine as I have taken but little during my life."*

REPLY.—1. You and your husband should go together to consult a physician who specializes in overcoming sterility.
2. Nothing in your letter indicates that you need a tonic.

CHAPTER LXVI

Venereal Diseases

VENEREAL DISEASE CAN BE BANISHED

When a way is found to remedy a bad condition, the importance of that condition increases. Society is in a position to end syphilis. It has every tool needed. The germ has been discovered. It is easily found in the secretions of the early syphilitic. For the late syphilitic there are laboratory, as well as clinical, tests. The germs are found post mortem in the very late manifestations of the disease—those ten to twenty years after. Therefore, so far as diagnosis is concerned, every phase is covered. This tool is practically perfect.

The remedies have been found. Preparations of mercury, arsenic and iodids are now thoroughly understood. Improvements may be made in these preparations but such will be velvet. Under their use, spirochetes may disappear from the secretions within a week. What the German scientists call "the great sterilization" can be accomplished within a few weeks.

Unfortunately, the spirochetes are in inaccessible as well as accessible places. Many are well protected against the blood—therefore, treatment must be persisted in.

The tool treatment is perfect enough for all practical purposes. The need is to use it in full instead of halfway.

Syphilis can be cured completely and permanently—so as to prevent the twenty-year after effects; so as to cure the next generation effects.

On the other hand, the use of the tools is far from perfect. To secure a more perfect use of these tools is the work of the new tool of public and private hygiene—education. When there is popular demand for laboratory diagnosis of syphilis by health departments, they will make such diagnoses. When the patient demands laboratory diagnosis of venereal disease by private physicians, by hospitals and dispensaries, it will be done. This is a part of the work of public education.

Much of the harm of syphilis results from half-cures—cure enough only to clear the skin and the throat but not cure enough to prevent locomotor ataxia, or insanity, or apoplexy, or premature old age, or blindness, or miscarriages, or inherited syphilis.

To secure a more perfect use of the tool cure—to substitute complete cure for half-cure—can be effected only by public education.

As to gonococcal infections, some of the tools are entirely satisfactory; others are in the way of becoming so. The diagnosis of early cases can be made by the microscope. The method is perfect. It is easily applied.

For the late cases, there is the microscope test and complement fixation.

Neither is perfect, yet each is valuable. The two combined with the clinical features, in the hands of physicians, make diagnosis satisfactory.

The cure of gonococcal infections is not perfect. To those who carefully and persistently carry out directions, the results are satisfactory. To those who stop when the symptoms decrease, the results of treatment are not satisfactory. Then the imperfections of treatment are largely due to the patient. No treatment is perfect until it is reasonably foolproof. The treatment of gonorrhea is not foolproof.

The work for the tool—public education—is twofold. To force laboratory examination of gonorrheal secretions as a routine procedure; to bring about the handling of gonococcal infections by the health department as in other contagious disease; to bring about complete cure of gonococcal infections instead of part cures.

SO-CALLED VENEREAL DISEASES

This series of articles deals briefly with different phases of the venereal disease question. It will tell the truth, seeking to avoid offense, and striving to make the presentation plain enough to be easily understood.

We advise that, wherever feasible, girls go to their mothers and boys to their fathers for further information, or better still, that parents discuss these subjects with their children. Family physicians hold an important relationship to these questions. Finally, there are a multitude of excellent books on these subjects, books that speak frankly, the tone of which is thoroughly wholesome.

These books are of the new style, in that the words employed and the ideas and illustrations used are chosen with a view to being easily understood by men and women of less than average intelligence.

In so far as the venereal diseases are concerned, conditions are bad. They are bad because the subject has been tabooed. The flood of light that has been turned on everything else has been kept away from this subject. The medieval method has been abandoned as to every other subject. Here a dark jungle island has been left in a sea of light.

We believe that generalized information will clear out this plague spot as it has the others.

Venereal diseases should be reported, registered, and controlled from the health departments; but these departments will not control them for years to come. Occasionally an exceptionally good city health department, such as those of New York City and Detroit, and such as California's among state departments, will attempt to register venereal disease. But the attempt at control does not go beyond registration, with some educational features attached. Outside the army and navy this is as far as our government will go in the near future.

Where is there hope of relief?

Thousands of people are killed; tens of thousands are made invalids for life. No class escapes. Venereal disease blinds babies; it mutilates innocent women; it lays low the men.

It is called the "red plague." It deserves the name; it is a plague, and it is stained red.

When the government fails us what remains? Education—such a knowledge of the facts as will lead to self-government.

Much of venereal disease can be prevented by greater morality. There will be groups of the young to whom chastity can best be taught by religious teachers.

Some of the education necessary to prevent venereal disease is properly the function of these teachers, as other parts must be given by parents; others by physicians; others by school teachers; others by health departments; others by the drama, and still others by the public press.

Webster's definition of virtue is "rectitude; strength; efficacy; valor; chastity." It would be a good idea to remove the semicolons and allow strength to flow into the other meanings. The meaning of this suggestion is that it is wise to promote virtue by ending the blindness of virtue.

The problem of morality is not the problem of venereal disease. With it, however, it has many points in common. Efforts to promote morality will result in bettering venereal disease conditions.

The venereal diseases should be classed with the contagious diseases. They should be reported at the health departments, and measures for their control planned by health departments.

Not every venereal infection results from transgression of the moral law. A large part of venereal disease is innocently acquired. Infants' homes, orphan asylums, and children's hospitals find it well-nigh impossible to keep free from venereal infections. If they think otherwise it is because they have never followed the policy of proper examination of their inmates.

Within the last ten years two up-to-date hospitals in Chicago have had experiences with gonorrhea in children. New buildings had been erected; every detail represented the last word in hospital construction and maintenance. The intention was to maintain everything so attractively that people with homes would prefer to go to the hospital. Each had provided an up-to-date children's ward.

Alas! within a month after opening venereal disease was epidemic among the children.

A meeting of the hospital superintendents of the city was called by the health department. The upshot of this meeting was that the careful, high-grade hospitals in the city adopted the policy of inspecting children on entrance and sending the gonococcus infected to the county hospital.

The county hospital, already under great strain in keeping the children in separate scarlet fever, measles and other groups, was further required to divide each group into two subgroups—the venereally infected and those not so infected.

The superintendents decided that the county could not escape getting venereally infected children in its wards. They were compelled to maintain separate wards, and it was wise for other hospitals to unload the venereally infected children into them.

The widespread prevalence of gonococcal vaginitis in young girls has existed for a long time. It will continue to exist until a definite policy to prevent it is inaugurated.

It is not a local condition. There is about as much innocently acquired gonococcal infection amongst young girls and babies in one portion of the country as in another.

Nor is the innocent acquirement of gonococcal infection limited to children. Most of the women suffering from pus tubes are not so suffering as the result of their own immorality, and many of them not as the result of anybody's immorality.

In order to understand the manifestations of gonococcal infections it is necessary to know something about the germ which causes it. The germ of gonorrhea is known as the gonococcus. It is one of the pus cocci. As a general proposition, we get on comfortably with the pus cocci. They make fairly good neighbors. With some of them we live in peace and harmony all the time. With most of them the lower animals (horses, dogs, chickens) live in complete harmony about all the time. Some of them have but slight capacity to harm and then only for a brief season.

For instance, a pus coccus, the staphylococcus, will crawl down a hair and get under the skin. Inflammation is set up; leukocytes rush to the field; a boil results. Within a week the leukocytes will have whipped out the pus germs, and the boil will be well.

Other cocci are usually bad neighbors, their peaceful states being rarer than the belligerent ones. The gonococcus, being of the pus germ family, behaves in a similar manner. It has the family traits.

In its generally known rôle it produces a violent suppurative inflammation. This stage starts after a three-day incubation period. This violent period lasts two weeks.

In this period there is a good deal of local soreness and swelling. The pus cocci get into the lymph stream and are carried to the lymph glands.

Occasionally one of these suppurates just as happens in an abscess or a boil. There is some fever and some aching. The toxins of the coccus are circulating in the blood.

Then follow the weeks in which the germs are getting accustomed to their neighbors. The suppuration gets less and the swelling passes away.

This is followed by the stage in which the germ is quite well adapted to its new surroundings. The germs have got into some gland or fold that does not easily clean itself, and there they may lie, quiet and harmless, for an indefinite period.

The stage of violent infection in the new host is succeeded by the stage of mild, latent infection.

This tendency to become adapted to its surroundings is what makes gonorrhea hard to control—that is, as a contagion spreading from person to person. As I said before it is this same quality which makes malaria hard to control—this tendency to become chronic, to relapse; this tendency of the parasites to make themselves halfway at home in the blood of a host.

More than half the men have gonococcal infections at some time or other in their lives.

A large percentage of the women suffer from such infection.

A small proportion of the children are infected by it.

The gonococcus infects the moral about as often as the immoral; the innocent as often as the guilty.

It produces sterility, blindness, and congenital deformity.

It kills thousands, maims tens of thousands; disables hundreds of thousands.

It rarely gets into the blood stream.

Once an infection occurs, the gonococcus is liable to lurk near the site of infection for years. When its symptoms are cured it is still there and ready to harm; then is the time of the truce of the bear.

Under a policy of ignoring gonorrhea the community is growing worse infected all the time. The policy of reporting and registering it, as with other forms of contagion, will come slowly. It will crawl with painful, discouraging, halting advances.

In the meanwhile we must hope for escape through education. There are other things we had rather learn about. There is nothing that we have more need to learn about.

"NO WORSE THAN A COLD"

A great many boys are of the opinion that a gonorrheal infection of the urethra is "no worse than a cold." They have had several attacks and they have cured each one with a mixture compounded by the druggist, or some advertised injection. In each instance, after a few days of treatment, the discharge has stopped.

The boy has come to entertain a contemptuous disregard for his disorder. Sometimes he thinks his method is the best ever, whereupon he spreads the news and recommends it to his friends. Sometimes he thinks he is a little more able to throw off such disorders than the common run of boys. Usually, he thinks the infection a thing of no consequence.

What has resulted from his treatment is that he has stopped the discharge; he has not cured the disorder. He has stopped the symptom of which he knew—the discharge. Had he observed more closely he would have noticed that not even that symptom was wholly cured and other less striking symptoms were present.

Had he talked with those who knew he would have learned that he was just as dangerous as though his main symptom had not lessened. He would have learned that what he supposed to be repeated cases was merely his old case recurring.

He had been infecting other people, and, to even things up, from time to time he had reinfected himself.

He had never been cured at all. The treatment that the drug clerk had been selling him and that he had been using on himself had stopped the only symptoms by which he, with his little information, could judge, and, maybe, had made him more dangerous to himself and others than he would have been had he left nature to fight the battle alone.

He had wasted time in treating a symptom when he should have been treating the infection underlying the symptom. It was as though he had been easing an appendicitis pain with morphin when he should have been having the disease attended to.

There may have been a symptomatic cure, but there had been no real cure.

A real cure is not effected until gonococci are no longer present, not alone in the secretions but in the tissues themselves.

The disease would not be so widespread were it not for the advertised cures, the drug store cures, the symptom cures.

VENEREAL DISEASES AND BLINDNESS

If there were no venereal disease, blindness would not be of great importance from the community standpoint. The blindness of old people is due to cataract; that can be remedied. Blindness can be caused by tobacco, but the blindness from this cause is inconsiderable. The blindness due to the trades that endanger the sight should grow less as the use of proper mechanical devices becomes universal.

More than half the blindness is due to two infections; of the outside of the eye—the conjunctiva—with gonococcus, and the interior of the eye with the spirillum of syphilis. As the blindness from other causes lessens, the blindness due to these two causes increases. Of these, the gonococcus infection generally occurs at the moment of birth or within a day or two thereafter.

Some state boards of health and some city health departments now supply physicians and midwives with a small package containing nitrate of silver solution and cotton. The instructions are to wash the baby's eyes with a boric acid solution at the time of the first bath.

The water used to wash the baby, in case soap and water are used for this first cleansing, is not allowed to come in contact with baby's eyes. Instead, a pledget of cotton saturated in boric acid is used for that purpose. One pledget is used for each eye.

Under no circumstances is the same pledget to be used for both eyes, nor is a pledget that has been used on one eye to be put back into the boric acid solution.

Then, in every case, a drop of the 1 per cent nitrate of silver solution is dropped into each eye. The silver solution is strong enough to kill any gonococci in the eye, but is not strong enough to inflame the eye.

This method should be followed with every baby. It is not enough to use it in the suspected cases. The infection seldom crops out there. It is in the unexpected places that this condition shows. Therefore, the Credé plan should be followed in every case.

The Germans have been following this plan long enough and carefully enough to cause us to pay attention to them, when they tell us that this measure will prevent nineteen-twentieths of the blindness that comes in infancy.

Occasionally the gonococcus does not destroy the sight in two or three days, as it does in newly-born babies. Occasionally the germ seems to be mild and to cause an ordinary case of sore eyes, or something a little worse.

For instance, the little girls who have an innocently acquired infection are not much disturbed thereby. The germ shows little disposition to travel upward and cause pus tubes and peritonitis, as in women.

When some of the secretion is carried on their fingers to their eyes, rarely does blindness ensue. There is a month or more of sore eyes.

So the harm done by gonococcal infection of the eyes is not limited to blindness; it is somewhat swelled by milder types of eye disease.

SYPHILIS

The gonococcal infection as a rule remains close to the focus of infection. The syphilitic infection speedily travels from the focus of infection to other parts of the body.

The germ of syphilis is known. It can be found with the microscope. It can be grown on culture media. Rabbits and monkeys can be inoculated with syphilitic secretions.

The gonococcus is fat and round and biscuit-shaped. The spirillum of syphilis is long, narrow, and wormlike. The gonococcus cannot move of itself. The spirillum is constantly wiggling like a worm and travels rapidly.

The gonococcus infection stays pretty close to where it starts. It frequently gets into the lymph channels, and is carried to near-by lymph glands. It may, though rarely, get into the blood, and be carried to the joints, causing rheumatism, or to the heart, causing heart disease. But when it is carried, it is passively carried, as a chip by a current.

On the other hand, the syphilis spirillum moves of and by itself, and, in addition, can be passively transported by the blood, or the lymph, or along free surfaces. It wiggles into the blood stream and is carried to any part of the body.

In the stage of syphilis known as the secondary, the spirilla abound in the blood. The secondary stage is characterized by fever. In extremely bad cases the patient may seem to have measles or scarlet fever.

I have seen such mistakes made. As a rule the fever and the eruption are mild, and sometimes so mild as to be overlooked. After that stage has passed—a few months after the infection—the spirilla are never in the blood for long. They wiggle in, float around awhile, and then wiggle out.

It is a mistake to regard syphilis as a blood disease. The blood seldom contains spirilla. If the spirilla stayed in the blood, the disease might be more easily cured.

The organisms are out in the tissues, around the blood vessels, the lymph vessels, and among the tissue cells. There they live, multiplying slowly and dying off at about the same rate, secreting little poison.

Syphilis is due to infection with a parasite that has the capacity of making itself much at home in the human body. Within three months of infection it is on neighborly terms with the cells surrounding it. Its harmful activities during a single day are immeasurably small, but, when the day's work is multiplied by 365, and then the product by ten, the harm is no longer immeasurably small.

The first point to remember is that syphilis is not a blood disease—in any proper sense.

The second point is that it is not a severe disease. Its mildness makes it possible for the germs to keep at their job for a long series of years.

The third point is that the disease is still actively at work when there is nothing to show for it—no eruption on the skin, no ulcers, no mucous patches, and no sore throat.

In order to handle the disease it is necessary to bear these three points in mind.

To cure, it is necessary to kill the germs in the tissues, in which locations they are harder to get at than if they were in the blood. The secondary symptoms, occurring when they are in the blood in numbers, disappear after a few weeks, or even days, of treatment.

It is necessary to bear in mind the mild nature of the disease in carrying out the treatment. However, the third point is the one of greatest importance. The temptation to consider oneself well—no longer a source of danger to others and out of danger so far as one's own future is concerned—the tendency to think that all's well when the symptoms disappear is strong.

In malaria, gonorrhea, and rheumatism we have illustrations of diseases that when half cured are even more of a menace than if no part of a cure had been effected.

Syphilis furnishes the best and most striking illustration of the harm done by confusing cure of the symptoms with cure of the disease.

After the spirillum has been crippled by a few months of treatment it can still remain in the tissues, crippling them so that ten or twenty years later gummata will be found.

In the unborn babe the disease can become virulent and speedily terminate life, or it may be fairly latent, producing conditions that do not manifest themselves for years after the child's birth.

The terror of syphilis is due to the lesions which it produces and the symptoms which appear after the disease has seemed to lie idle for years.

THE VENEREAL PERIL

The only figures as to the prevalence of venereal disease that are at all dependable are those of the army and navy. All other figures and statistics are guesses, some shrewd, some less so, but only guesses.

The army finds that venereal disease now disables more men than any other cause. Typhoid fever has been banished from the army and navy; malaria is under control, and venereal disease, as a producer of disability, is without a rival.

In 1902 the venereal disease rate in the United States army reached 162. This means that, during that year, out of each 1,000 men enlisted 162 contracted venereal disease. The rate remained around 150 until 1907, when a moderate decline began.

After several years of experiment and investigation the army surgeons adopted a venereal disease policy in 1910 and, in consequence, the rate rapidly dropped. In 1912 it was 110; in the last quarter of that year it was 91.

Colonel Kean tells us that the surgeon-general's report showed that in 1911 there were 11,211 cases of venereal disease, whereas there were but 3,737 cases of typhoid fever, malaria, smallpox, measles, scarlet fever, diphtheria, dysentery and tuberculosis combined.

The constantly non-effective rate is about 13; out of each 1,000 men thirteen are at all times off duty because of venereal disease. Surgeon General Rixey, in his 1909 report as to the disablement of sailors in the navy from venereal disease, wrote:

"This class of disease would have operated to render entirely ineffective for over a month three battleships with a complement of 1,000 officers and men each."

The navy rate in 1909 was 160. I understand that they are controlling venereal disease after the same plan employed in the army, and that their rates are falling about as rapidly.

At that, we were several years behind other nations in beginning our fight on venereal disease. The British army rate at its worst was 275. They had driven it down to sixty-six in 1909. The Prussian army in 1909 had a rate of eighteen, and the French army, of twenty-two. No Continental army, not even that of Spain, had a rate much higher than our rate at its worst.

In an account of morbidity in the army on the Rio Grande, Colonel Kean said that four men from each 1,000 were at all times out of service from venereal disease. Syphilitics were not counted, as the disease in them was latent.

If there were any way to discover the conditions in civil life it would be found that they do not differ greatly from those in army life. The amount of venereal disease in the army at home is a fair index of the amount among civilians.

Judged by this standard, American conditions are worse than those of Great Britain, Germany, or France. Are we not called on to do something about it?

ADVERTISING DOCTORS—MEN'S DISEASES

In 1911 Dr. ———, the men's specialist of Los Angeles, advertised that he was the only advertising specialist in that city who was going by his right name. As a matter of fact, a majority of the medical offices are advertised under the names of men who have been dead for years or who never lived.

When we consult medical directories we find that men of the names used are not graduates in medicine at all, or else they have graduated from the poorest grade of medical colleges.

Medical methods employed in these offices are either exactly the same as those employed elsewhere, or else they are not up to date. The best that can be said of the best of them is that they employ the standard methods. The statements that they make use of more advanced or more scientific methods, or methods that the regular practitioners know nothing of, are entirely without foundation.

Then, if the methods used are below the average and behind the times, and the men hired to run the offices and give the treatment are low grade, poorly educated, badly informed, and cheap doctors, how do they take in enough money to pay the advertising bills?

They have two business methods that take well with people who do not know the ways of schemers. One is case taking and the other the follow-up letter system.

A good case taker is the keystone of the office. It is his business to scare the victim, talk of the gravity of the case, and to promise a cure. His tribe has created a lot of diseases that have no existence—varicocele, lost manhood, etc.—bogies with which to frighten. In case there is some disorder and

the cure does not come as promised, the objecting patient finds himself in the hands of a new case taker.

The symptoms of venereal disease are easily cured. After a few weeks' treatment, the patient in the hands of an advertising doctor finds himself without symptoms. He thinks he is cured, that the advertising doctor has cured him.

As to just when he is actually, not symptomatically, cured is a difficult point to decide. It is necessary that the infected man should be advised on this point. He cannot tell for himself. Here he must have somebody whose advice he can accept without question.

No man can read the wording of the advertisements, no man can pass through the hands of a case taker, no man can read one of those medical follow-up letters without concluding that the advertisers are not to be depended on.

Why do they hang on? Because nobody has made it his business to inform the people. When people become well informed they will be able to judge. The men's specialists and private disease specialists will have to find other work.

MEASURES FOR CONTROL

The rapid improvement in the conditions in the army during 1912 is the result of the policy outlined in a general order, as follows:

"1. It is enjoined upon all officers serving with troops to do their utmost to encourage healthful exercise and physical recreation and to supply opportunities for cleanly social and interesting mental occupations for the men under their command; to take advantage of favorable opportunities to point out, particularly to the younger men, the inevitable misery and disaster which follow upon intemperance and moral uncleanliness, and that venereal disease, which is almost sure to follow licentious living, is never a trivial affair. Although the chief obligation and responsibility for the instruction of soldiers in these matters, rest upon the company officers, the medical officers should coöperate by occasional lectures or other instruction upon the subject of sexual physiology and hygiene and the dangers of venereal infection.

"2. Commanding officers will require that men who expose themselves to the danger of contracting venereal disease shall at once upon their return to camp or garrison report to the hospital or dispensary for the application of such cleansing and prophylaxis as may be prescribed by the surgeon general. Any soldier who fails to comply with such instructions, if found to be suffering from a venereal affection, shall be brought to trial by court martial for neglect of duty.

"3. Commanding officers will require a medical officer, accompanied by the company or detachment commander, to make a thorough physical inspection twice in each month of all the enlisted men (except married men of good character) of each organization belonging to or attached to the command. These inspections will be made at times not known beforehand to the men and preferably immediately after a formation. The dates on which the physical inspections of the various organizations are made will be noted on the monthly sanitary reports."

Colonel Kean, in "The Venereal Problem in the Army and Navy," says that the campaign against venereal disease in the British army was not the least of the victories of Lord Kitchener. That highly successful campaign embraced four lines of activity:

1. The new cantonment rules.
2. The continuance of treatment in cases of syphilis after discharge from hospital so as to prevent recurrence of symptoms.
3. Putting bazaars out of bounds.
4. Moral influence—lectures and talks to the men, amusements, etc.

The new cantonment rules referred to were rules requiring the reporting of venereal disease and providing proper care for those infected. The insistence upon treatment until fully cured applies to gonorrhea as well as syphilis.

HOW TO KNOW SYPHILIS

The first symptom of syphilis is a small ulcer. This ulcer generally begins at the point where the spiral germ entered. It starts three weeks after infection.

In every case of syphilis, an effort should be made to find out from whom the disease was contracted. The source in any given case may be endangering other people and sometimes there is no suspicion, on the part of the person harboring the germ, of the harm that is being done.

To investigate a case, fix the date of the first appearance of the ulcer and then review the happenings of three weeks before. Remember that the ulcer develops at the exact point where infection occurred and nowhere else.

The ulcer, to begin with, is not an ulcer. The spirochetes are in the tissues and around them a hard nodule forms. Presently the nodule breaks down on the surface and a punched out ulcer appears. This ulcer does not pain greatly, itch or run much. The process is not due to pus germs. Therefore, unless pus germs later infect, there is not much pus or pain or much swelling.

It is constantly happening that this ulcer is so small and so painless that it is entirely overlooked, or thought to be a fever blister, until the general skin eruption comes on two to four weeks later. Then the person, for the first time, remembers the almost unnoticed, almost forgotten, ulcer.

The ulcer has hard edges and a punched out appearance that is easily recognized by a physician when typical, but which sometimes is atypical. But, fortunately, within the last few years, the germ has been discovered. It is easily found in the secretions from the ulcer and from the secretions of any secreting patches that develop as secondaries.

The state and city boards of health are now equipped to examine these secretions. The examination is easier made than is the examination for diphtheria or consumption. If your department of health does not examine secretions for the spirilla of syphilis and for the coccus of gonorrhea it is because they have never been stimulated to make them. The venereal problem will not be started toward solution until laboratory examinations for venereal diseases are a matter of daily routine exactly on a par with consumption examinations.

After syphilis has progressed beyond the stage where the secretions will show spirochetes—also called spirilla—under the microscope, there are certain laboratory tests that are reliable, though not so reliable as the spirochete test. One of these is the Wassermann; the other is the Noguchi. These tests are especially valuable in that they give light not only when the rashes are present or the glands are enlarged but also years after when there is nothing to show that infection is present.

Within the last few years, the spirochetes have been found in the brain in paresis and in various other syphilitic diseases that come years after the original infection. This information is worth a great deal to the physician, but there is no way of proving the case to be syphilis by finding the organism in the tissues during life. In these cases, reliance must be put on the Wassermann and Noguchi tests, supplemented by what is known as the therapeutic test.

The therapeutic test consists in giving the person under suspicion a course of mercury or mercury and iodid, or of the newer arsenic preparation—salvarsan. If there are symptoms and these get better very rapidly under the therapeutic test, the evidence is sufficient for a diagnosis.

We have for the diagnosis of syphilis, examination of the secretions for the germ—of greatest value in the early stages—to be done by the physician or by the health departments. Examination of the patient—to be done by the physician. Some communities have dispensaries and hospitals to care for those cases not otherwise able to care for themselves, and protect the community. Examination of the blood by the Wassermann and Noguchi tests—to be done by health department laboratories in some instances and by private laboratories. The therapeutic test—to be done by the attending physician.

HOW TO KNOW GONORRHEA

The gonococcus is a pus coccus. The first effect of infection is a suppurative inflammation. The test that can be depended on in these early stages is the microscopic test. The health department laboratory will make this test. In some communities, the test is a routine procedure. It is made, in large numbers, every day in the year just as diphtheria tests are.

A little pus spread on a glass slide is all the material needed. The dried pus is just as satisfactory as fresh pus. If your health department is not making the test it is because the people have never asked that it be done.

See to it that your health department adds laboratory examination for venereal disease to its list of activities.

In the early stages, the gonococcus not only attacks the mucous membranes but it kills off all other bacteria. Therefore, in the pus from such cases, no germs are found except gonococci. After a few weeks other germs are again found in the pus and gonococci are less abundant.

Microscopic examination of late cases is not so valuable nor so dependable a procedure.

After the infection has been carried away from the point of entry and is infecting tissues that are remote, diagnosis is more difficult. Illustrations of what is now in mind are gonorrheal pus tubes, gonorrheal peritonitis, gonor-

rheal rheumatism. For such cases, there is a laboratory procedure called complement fixation—a pretty fair test and one that helps out a good deal in some hard cases.

The type of examination made in a segregated district is of no practical value. It is a superficial examination. No microscopic tests are made.

METHOD IN USE IN U. S. ARMY

A suitable, easily accessible room in the hospital (or dispensary) at each post will be selected for this purpose, which should be provided with a good light and such medical supplies, basins, and other equipment as may be necessary. A competent, properly instructed man of the Hospital Corps, or more when necessary, will be on duty there between retreat and reveille, and will be within call at other hours.

The procedure in the case of men reporting for treatment will be as follows:

1. The name, rank, and organization of the soldier, with the day and hour of treatment, should be entered for record on a card furnished for the purpose, which will afterwards be examined and authenticated by the initials of the medical officer. These records should be regarded as confidential and should be kept in a secure place and not shown to unauthorized persons or except upon proper authority. They will not be preserved longer than three months.

2. The genital organs will be thoroughly washed with soap and warm water.

3. An injection will be made into the urethra of 4 c.c. of the standard solution of 2 per cent protargol dissolved in glycerin 15 parts, water 85 parts. This should be retained in the urethra for three minutes. In individual cases when the protargol solution is found to produce an irritating effect, a 20 per cent solution of argyrol may be used. Other solutions or modifications of these solutions will not be used for routine administration.

4. The entire penis will be rubbed with calomel ointment (30 per cent in benzoated lard), care being taken that the folds of the prepuce and about the frenum are thoroughly covered. If any pimples or abrasions exist about the scrotum or the pubic region, these should also receive an application of the ointment.

The parts should be then wrapped in a napkin of soft paper furnished for the purpose, in order to protect the clothing.

A medical officer may for special reasons use other preparations than those above specified, but only when he personally gives or supervises the administration of them. Report will be made in such cases of the drugs used and the results obtained, with reason for departure from the routine treatment.

(Note) Protective packets will not hereafter be issued by the Medical Department, but in view of the fact that the hospital method of prophylaxis will not be applicable to soldiers on passes or furloughs of more than 24 hours, it is recommended that medical officers make the suggestion to the proper military authorities that a protective packet be kept on hand for sale at post exchanges. A tube containing an ointment which is efficient both as an

injection and for external application is to be preferred. The following formula has been found efficient:

Camphor	3 per cent
Phenol	3 per cent
Calomel	.25 per cent
Adeps Lanae	.35 per cent
Benzoinated lard	.34 per cent

The protective packet generally known as the A. & N. (Army and Navy) packet is put up by several pharmaceutical firms and can be had at drug stores.

PROSTITUTION IN RELATION TO VENEREAL DISEASE

There are many opinions extant as to the percentage of venereal diseases due to prostitution. These estimates place the figures so high that many hold that by regulating prostitution venereal disease will be regulated. These figures are but estimates.

Some of these opinions are entitled to weight; others have little value. Based on these opinions, health officials have been advised to work for segregated, regulated vice as a means of controlling venereal disease.

Generalizing procedures—dragnet procedures—are in a bad way amongst health authorities now. They began to get results in controlling diphtheria when they quit watching sewer gas and concentrated on the bacillus.

The trend of opinion amongst health officials is that no shots count except those against the bull's eye. To herd all the women of easy virtue into one part of town as a means of controlling venereal disease is ineffective. In the first place, they cannot be herded. Segregation does not segregate.

The method of medical inspection does not, and cannot, protect against infection. Even as the plan is worked under such an absolute monarchy as Japan, it does not control venereal disease. Under American government, it causes venereal disease.

It is proper to search for venereal disease amongst careless people—both men and women—with extra care, and to take adequate pains to control the infected. This plan is followed in Detroit. It is proper to placard houses of prostitution, where venereal disease in highly contagious form exists, until such time as the spreader of contagion comes under control—as has been done in Chicago.

But it is not proper to inspect women and certify that they are incapable of spreading contagion and will so remain for a week or a month. Nobody can truthfully make that statement as to venereal disease, smallpox or scarlet fever.

That the health authorities coincide in the above opinions is proved by the official proceedings of the section on preventive medicine of the American Medical Association, June, 1911, and the proceedings of the American Public Health Association, October, 1910.

No health department in the United States advocates segregation of prostitutes as a means of controlling venereal disease.

GONOCOCCAL INFECTIONS IN CHILDREN

Every mucous or purulent discharge from the genitals of a child is a matter for investigation. Infection is the cause in every instance. In most cases the infection is with the gonococcus.

The microscope will show the organism. It is a good guess that any catarrhal—so-called—vaginal secretion in a child is due to gonococcal infection and is not to be treated lightly.

The effects in young girls are very much lighter than in mature women. Occasionally, changes are caused which make sterility inevitable. Occasionally, the eyes are infected and sometimes blindness results. Frequently the child is a focus of infection.

Contagious disease hospitals can prevent the development of gonococcal infections by:

Systematic microscopic examinations.

The use of diapers on all children not proved to be free from infection.

Segregation and treatment of infected children.

MARRIAGE REQUIREMENTS

In 1912, Dean Sumner of Chicago announced that he would marry no one in his church unless each party brought him a certificate of good health signed by a physician. Since that time, many ministers have adopted the same rule and many others have indorsed it.

The opponents of the measure have stated that the examination of the prospective bride and groom will be so superficial as to be of no value in determining the presence of contagion in a condition capable of becoming active under stimulation; that in the latent stages of venereal disease, especially gonococcal infections, there is considerable difficulty in deciding that infection is present. Furthermore, that human eugenics is not developed enough to make expert opinion of great value, while the average run of medical men are not well enough informed on this very new subject to make their opinion of much value.

To which advocates of the plan reply, that though the plan may have all the shortcomings cited, it is still far better than no plan. It is an initial proposal and has the right to be judged as such. It lays no claim to perfection, but it does claim superiority over the entirely uncontrolled procedure for which it is offered as a substitute.

The opponents argue that those who think themselves sub-standard will not abstain from marrying—they will go to other ministers. To which the answer is that some will, while others will delay marrying until conditions are more propitious.

But even these arguments pro and con miss the main point. The great gain to moral cleanliness and human welfare from the position taken by Dean Sumner was through the attention attracted to the subject and the controversy that his position aroused.

Havelock Ellis, in his "Task of Social Hygiene," advocates as a positive

eugenics procedure the building up of an aristocracy of good blood. By good blood is meant that the family tree should show freedom from inheritable defects such as feeble-mindedness, drug and drink addiction, insanity, criminality, hemophilia, migraine, epilepsy, neurasthenia and other inheritable diseases, and so on through many items.

The idea of an aristocracy of blood is a positive eugenics suggestion capable of great good. Dean Sumner's proposition is one making for an aristocracy of cleanness in blood. As great as will be its value along this line, its greatest value has been, and will be, in making the subject controversial; in making it a matter of discussion and in keeping it such.

HOSPITALS AND DISPENSARIES

An essential for the campaign against venereal disease is a hospital and dispensary system for venereal disease. We now have consumption dispensaries, hospitals and sanitaria. We send physicians to homes and we provide hospital care for scarlet fever and diphtheria. Venereal diseases are contagious. They affect the innocent as well as the guilty. To control them, there must be hospital and dispensary facilities. It is not enough that there are private physicians. They do not and can not cover the field.

Many people go untreated, many treat themselves, many are treated by druggists, many are treated by advertising doctors. None of the members of these groups is treated until completely cured. They use the same drinking cups and towels and toilet facilities as well people. Many of them, when half incapacitated, must stay in lodging houses because hospitals do not want them. The conditions for the spread of contagion in lodging houses are excellent.

It is not enough to insist on complete cure and make no provision for it. Municipal laboratory diagnosis of venereal disease, reporting of venereal disease, a campaign for education in venereal disease, are all well, but another flank must be provided and that is a hospital and dispensary system.

INSANITY AND VENEREAL DISEASE

Justice Hughes says that one-half of the insanity is curable. Using this quotation as a text, Homer Folks writes as follows:

"One kind of insanity is known popularly as 'softening of the brain.' It is known scientifically as general paralysis, or paresis. It is incurable by any means now known to the medical profession. Those afflicted with it suffer gradual mental and physical decay. The very substance of the brain becomes changed. They usually live but a few years. It is now agreed by the medical profession that this disease is caused by an earlier disease known as syphilis. Syphilis is a germ disease. It is usually the result of immoral habits, though one may get it innocently. Every man and boy should know that by yielding to the temptation to go with immoral women he is exposing himself to the probability of getting this disease, which may result, years after, in incurable insanity. Over the door of every immoral resort might truthfully be written, 'Incurable insanity may be contracted here.' If self-respect, the desire for

the good opinion of others, the influence of religious training, and the attractions of home life are not sufficient to prevent this kind of wrong-doing, the danger of contracting a disease which may result in incurable insanity should be sufficient.

"The number of patients having paresis or 'softening of the brain' admitted to State hospitals during the year ending September 30, 1910, was 600 men, or 17 per cent of all men admitted, and 263 women, 8 per cent of the women admitted."

INHERITED VENEREAL DISEASE

Syphilis can be inherited; gonorrhea cannot be. The syphilis organism can be transmitted to the child by the mother. The organism can infect the mother and not infect the child. The spirochetes in the mother, during the nine months of pregnancy, have been outside the blood stream—pretty well walled off in some isolated area.

An infected father can infect the mother and thus indirectly infect the child. The spirilla may infect the placenta and thus kill the child, producing miscarriage. The organisms in the child may be so abundant and so poisonous as to destroy its life.

The organisms may pass into the child and cause inherited syphilis. Syphilitic babies look like old men and women. They are weazened and old in appearance. Sometimes when less profoundly poisoned, the appearance is not greatly altered, but the bones or some of the internal organs are affected. Sometimes the infection lies latent until later life—a wait of twenty years or more, as in other forms of syphilis—the spirochetes have been walled off somewhere or other. And then something occurs to permit the escape of the organisms, whereupon the disease takes on an active form.

The person with inherited syphilis harbors the germ of the disease and is infectious to others in the same way and for the same reasons as are those infected by contact. A case of inherited syphilis is not infectious so long as the organisms are walled off and the disease is latent. When there are ulcers or patches in the secretions of which are organisms, anyone touched by these secretions is liable to be infected—if the point touched is one that can be infected. For instance, any mucous membrane, any lining, is easily infected by contact.

The skin is not easily infected. The dead layer prevents infection so long as it is unbroken. The skin can be infected whenever there is a cut or scratch that permits the organism to get through this dead layer. The organism can be carried on the skin of the hands to the mouth.

A baby with inherited syphilis can infect its wet nurse, provided the disease is active in the baby—for instance, if there are patches in the mouth and the nurse has some crack or fissure of the nipple.

While gonococcus infection cannot be inherited, yet this infection is of importance in certain inheritance relations. It is largely responsible for sterility in both the male and female. It may travel to the interior of the uterus in a pregnant woman and infect the placenta, causing miscarriage, or it may produce deformity in the developing child. And finally, the child as it is being born not infrequently has its eyes infected and is blinded therefrom.

VENEREAL DISEASES IN NEW YORK CITY

During the month of January, 1913, the Department of Health requested 7,000 physicians in Greater New York to furnish the department with information regarding the number of cases of syphilis, gonorrhea and chancroid that had been under their care in their private practice during the twelve months previous, in order that some idea of the number of cases of venereal disease treated during 1912 might be obtained. Only 2,215 physicians responded to this request, reporting 13,348 cases of syphilis, 24,980 cases of gonorrhea, and 4,431 cases of chancroid, making a total of 42,659 cases of venereal disease treated in the private practice of less than one-third of the physicians of this city within twelve months. The number of cases of syphilis is especially and alarmingly large. A complete census of the cases treated in institutions has been unobtainable up to the present time, but the institutional cases, without doubt, exceed in number many times those treated in private practice. The apparently extensive prevalence of venereal diseases in New York City certainly furnishes food for thought.

During 1912 the Serological Laboratory of the Department of Health tested 4,585 specimens of blood for syphilis and 545 for gonorrhea, while from January 1, 1913, to June 1, 1913, 5,639 blood specimens were tested for syphilis and 846 for gonorrhea.

CONTINENCE

Sooner or later every boy must decide whether or not he will permit himself sexual indulgence of one sort or another, if not with women, then in some irregular way. Every boy must answer for himself the question—Shall I yield to my passions? The answer should be—No.

The first thought that comes into his head is that sexual activity is necessary for strength and development. He has heard this from somebody and to him it seems rather reasonable. He has been wrongly informed. A part of the sex gland secretion is necessary for strength and development but that part is absorbed directly into the blood and is never mixed with other portions of the gland secretions. Sexual indulgence is not necessary for physical development.

The next question he asks himself and perhaps others is—How can a boy keep his passions down? And, particularly, is there any medicine he can take for the purpose? The answer to the last half of the question is—No. No medicine is to be taken because, in the first place, no medicine given for this purpose has any virtue and, in the second place, it is not proper to be dosing oneself all the time. Taking medicine for this purpose does no good and may do harm.

The scientists who study the conduct of human beings, as other scientists study the conduct of bugs and insects, speak of those persons who cannot control themselves as the "feebly inhibited." The feebly inhibited have not the force of character, the moral force, the self-control necessary to refrain from outbursts of anger, the desire to get drunk or to take opium. The

feebly inhibited are not insane, but they are weak, and among them many cases of insanity develop. The condition, feebly inhibited, varies in degree. Some people are able to resist almost every temptation, others can resist some temptations, others can resist no temptation which makes any sort of appeal.

When a person has no capacity for restraining himself sexually he is clearly feebly inhibited. If he is able to control himself thoroughly, clearly he is not feebly inhibited. In between these two extremes are all sorts of gradations.

Sexual indulgence then means not that the boy has a strong character and strong will. It means that he has a weak character and weak will.

If a boy feels himself tempted almost to the point where he cannot resist, can he lessen his desires and increase his resistance? Yes—by right living. Some of the rules are:

1. Overeating is to be avoided. A heavy meat and eggs diet is especially to be avoided.
2. The bowels are to be kept regular.
3. The boy must do hard physical labor either in his daily work or else in his play. It is the idler and not the athlete in active training who is dissolute.
4. The boy must keep good company. Boys who tell lewd stories and who indulge in salacious gossip are especially to be avoided.
5. He must cultivate his morals by thinking morally and living morally, by associating with moral people.
6. He must cultivate decision and strength of character.

The above statements apply to girls as well.

NIGHT LOSSES AND WET DREAMS

The spermatozoa manufactured by the testicles are stored in sacs provided for the purpose and located in the pelvis at the base of the bladder. These sacs are called the seminal vesicles or sacs. When these sacs become over-distended with secretion they empty themselves. If they empty during sleep the result is a seminal emission, night loss or wet dream.

For such emptying to take place is natural. When it occurs with moderate frequency it means that the man is vigorous. It is a sign of health, not of illness. Wet dreams do not lower vitality or cause a loss of manhood or bring about insanity.

Then why all the fear on the subject? The people have not had any opportunity to read the truth. The plain truth was supposed to be too indelicate a subject for newspapers and books. But the quacks had no such scruples. They have used newspaper space, billboards, pamphlets and books to frighten the people about wet dreams. The only chance for education on these subjects was the writings of the quack. Everybody wanted to know—therefore, they read what the quacks wrote. It was their only source of education. In consequence, education in error and in groundless fear is the rule.

It is only exceptionally that we find a man who knows that wet dreams are a good sign and not a bad one; that they are a sign of strength, not of weakness; that in a young man they are natural and not unnatural.

There is nothing specially vital about the seminal fluid. When it is discharged there is no special drain on the system. The sex glands do secrete powerful chemicals very necessary for the grown person. Those secretions are known as the ductless gland secretions of the gonads or sex glands. But get this clearly in mind—this secretion passes directly from the sex glands into the blood. It is never discharged as is the ordinary secretion. Therefore, night losses have nothing to do with that secretion. That part of the secretion which is discharged has to do with the formation of the child; it has nothing to do with the health or strength of the man (or the woman, for that matter).

But the great part of those who fear they are going insane because of night losses are even more foolish still. They notice that when they strain at stool a few drops of discharge flow from the urethra. They have read that this is seminal fluid, that the loss of a drop of it at stool indicates that it is oozing away all the time and that insanity and loss of manhood will be a necessary result. This discharge is nothing but a few drops of mucous secretion from the urethra itself. It is composed of about the same chemicals as a nose discharge or phlegm from the throat. Such discharge is unimportant from every standpoint.

SELF-ABUSE

I feel like saying no word for self-abuse. Nothing can be said for it. It is not necessary for health or strength as some boys are told. It is filthy and immoral. But at that it is not so bad as it is painted. Self-abuse does not cause dementia precox or insanity or loss of memory. Here, again, we have an effect of that education of misstatement by the advertising doctor. He wanted business. The way to get it was to frighten. There is no better way to frighten boys and men than to tell them with some show of authority that self-abuse causes loss of memory, indecision and, finally, insanity.

This is the explanation of the present popular view of self-abuse. A saner view is that it is somewhat harmful physically; that it leads to even worse habits; and that it lowers a person's self-respect and moral tone.

LOST MANHOOD

What these words mean nobody knows exactly. They are mighty good words to scare a poor fellow with and, in consequence, the quacks have worked them overtime. We have been told that lost manhood means that the man's vitality is gone. It means nothing of the sort. It means that the man is worried or afraid. The way to cure a man of lost manhood is to get fear out of him. If the man who is afraid that he is suffering from lost manhood will stop thinking about his sex organs, his sex life, sex matters of every kind—will put the subject wholly out of his mind—he will find his lost manhood. The best way to find your manhood is to lose all thought of it.

VARICOCELE

It would be almost true were one to say there is no such disease as varicocele.

Within the scrotum are the veins which return the blood from the testicles. These veins being somewhat loose in the scrotum are without the lateral support which most veins have. The walls of all veins are thin and the tissues lying next them in part support the thin walls. The veins which return the blood from the testicles have no such support. In consequence, in a great many men, the veins of the scrotum are somewhat enlarged. In describing the feel of these enlarged veins it is frequently said that they feel like a "bag of worms." That is the condition known as varicocele and that is all that it is.

Have you ever noticed a crooked, swollen vein on your forehead or on your hand? What does that amount to? Or the enlarged veins of piles? Whoever claimed that these endangered life, or were liable to be followed by dreadful consequences? The only reason for the fright which some people get about varicocele is the campaigns to frighten them which advertising men have run for years.

Varicocele is of no consequence. It does not endanger life, or health, or the sexual powers. It does not lead to loss of sexual powers. Let a man with varicocele lead a pure life or let him marry and his varicocele disappears nine times out of ten.

The only importance of varicocele is that it is a source of fear and worry. Varicocele is a prolific source of sexual neurasthenia. In other words, the condition varicocele is of trifling importance, is practically non-existent—but the bogy varicocele has a lot of men scared to a frazzle.

What is the best treatment for varicocele? To forget it.

WHEN CAN A SYPHILITIC MAN MARRY?

Pusey says that the following rule is safe to follow. A patient may marry five years after infection provided that, during the first three years, he has been thoroughly treated and during the last two years he has shown no manifestations of the disease. Marriage in accordance with this rule is safe even though the person gives a positive Wassermann reaction.

The Wassermann reaction is not of value in settling the advisability of marriage. Within the first years after infection marriage is not safe, though a Wassermann is negative. Later on, marriage is safe even though a Wassermann is positive.

Syphilis is actively contagious in its primary and secondary stages. It is not contagious during the tertiary stage. A positive Wassermann is a symptom of tertiary as well as of primary and secondary syphilis. Therefore, it is not a dependable guide for marriage.

If syphilis is not contagious during the tertiary stages, what is the danger from marrying once the secondaries have disappeared? The danger is that there will be a relapse and that secondaries will appear, during which the

disease is contagious. The question then comes down to the danger of a relapse.

Pusey quotes Gennerich as proving that, when the treatment is begun very early and kept up very actively, only 5 per cent of the cases relapse. By giving full doses of salvarsan, or its equivalent, as soon as the disease could be diagnosed, the symptoms disappeared in a few days and all evidence of infectiousness was gone in a few weeks. By persisting in active, thorough treatment the percentage of relapses was very small.

Ninety-five out of each 100 cases treated by the Gennerich method (salvarsan and mercury in full doses) could marry in three months with safety. But nobody can tell which case is to fall in the 95 per cent group and which in the 5 per cent group. Therefore, no person with a conscience will recommend marriage after so brief an interval.

So few people make the taking of syphilitic treatment their business of first importance or even a matter of great importance. Some stick well all the time, some carry out directions for most of the time, some are less careful still. It is for this reason that competent authorities are so conservative in their recommendations, for there is a vast difference between the theoretic safety after a three months' interval and the conservative rule requiring a five years' interval.

Keyes found that the chance that a syphilitic husband, taking no special precautions, would infect his wife during the first year of his disease was 12 to 1. If he did not expose her until the second year of the disease and then took no special precautions to protect her, the chance that he would infect her was 5 to 2. During the third year the chance was 1 to 4. After the fourth year the chance of infection was very slight.

In former times we spoke of the danger that a man would infect his progeny and that he would infect his wife as being separate subjects for discussion, on the theory that a man could infect his unborn child without infecting its mother. It has been proved that, unless a man infects his wife, he cannot infect his children with congenital syphilis. Congenital syphilis can only be conveyed to the child through the mother.

WHEN CAN A SYPHILITIC WOMAN MARRY?

The question is divided into two parts. First, what is the danger that she will infect her husband and how long does that danger last? Second, what is the danger that she will infect her children and how long does that danger last?

As to the first question. The rules are the same as in the case of the man. Vigorous treatment may cause her lesions to disappear in a few days. She may cease to be infectious in a few weeks. Should she have a relapse, she would be infectious during the relapse.

As to the second question. The danger that a mother will infect her child is greater than the danger that the father will. In well-treated cases women bear healthy children, in some instances, within a year after infection. After four years in such cases there is practically no danger. Irregularly and improperly treated women have been known to bear infected children

ten years after they were infected. The rule given as a safe, conservative one for a syphilitic man is also safe and conservative for a woman.

MARRIAGE AFTER INFECTION WITH GONOCOCCUS

A man who has been infected by gonococci can marry with safety when all discharge has ceased and cannot be renewed by irritation of the urethra by the passage of a sound, provided there is no sign of infection of the prostate and testicles and a complement fixation test is negative.

To be certain no relapse will occur, the interval between the total cessation of all symptoms as above indicated and marriage should be at least three months.

A woman who has been infected with gonococci can marry with safety when all discharges have ceased and cannot be renewed by irritating applications to the urethra, vagina or cervix, provided there is no sign of infection of the fallopian tubes or endometrium and complement fixation is negative.

To be certain no relapse will occur, the interval between the total cessation of all symptoms as above indicated and marriage should be at least three months.

The gonococcus is prone to locate on the surface of membranes or in the lining of glands. It does not infect the deeper tissues as does the treponema of syphilis. In consequence, gonococcal infections are less apt to relapse in after years than is the case with syphilis. If a person who has been infected is free from all discharges and from all symptoms of inflammation of the genital organs, it is reasonably certain that he or she is cured of his or her disease and is therefore not subject to relapse. If there are discharges, there should be no marriage. Whether in the man or woman, there should be no marriage until microscopic tests and a complement fixation test have shown that gonococci are not present.

Parents cannot transmit gonococcus inflammation to an unborn child, except that the eyes of the child being born may be infected by the discharges from an infected mother.

Inherited Syphilis.—*Mrs. A. W. C. writes: "My father contracted syphilis in youth and died from effects of same a number of years ago. My mother has always been in perfect health. I am 32 years old, have one boy 9 years old. I have never been sick with the exception of the ordinary ailments of life. No eruptions on my skin or anything in fact. Am apparently in perfect health. My boy also is in perfect health.*

"What I should like to know is whether or not I run any chances of inheriting any bad effects after this number of years and whether or not it would be advisable to have a Wassermann test made. Please let me hear from you soon, as I have seen two or three similar cases lately which have been practically the same although the offspring had shown some symptoms of rickets, etc., when babies."

Reply.—I do not think you have anything to fear. Your father apparently never infected your mother, which means that you are not infected. Even if you were infected the chance is that your boy is not, since the blood cleans itself in a generation or so. Then, too, the time

that has elapsed without symptoms is in your favor. You and your boy are all right, I am sure.

Insufficiently Treated Syphilis.—*Mrs. M. R. J. writes: "About 7 years ago my fiancé contracted syphilis through the use of a public towel. The only symptoms present, beside the original ulcer which formed on the neck, were ulcers of the mouth and throat. After a few months treatment these ulcers disappeared. Before learning the nature of the ailment I contracted it through a kiss. I experienced every possible symptom: slight fever, falling hair, ulcers in mouth, copper-colored spots and lumps on the neck and under arm. After four weeks' treatment every symptom disappeared. The physician who treated us said that having contracted the disease at second and third hand the attack would probably be light. We were married a year later and have experienced no further symptoms. We are rather above the average in health and good family histories and lead very regular lives. 1. Is it not possible that the disease is cured? 2. If not, what form would a recurrence take and are there no means one could apply to minimize the chance of a return?"*

Reply.—1. It is not probable that you are cured though it is possible. I do not know what you mean by catching it at second or third hand. Both of you caught it from someone who had it as does everyone who has it. The way you caught it does not warrant the prophecy that it will be mild. You and your husband should have more treatment.

2. If you have gone for seven years without relapse you will probably not have one now. What you should look out for now is locomotor ataxia, paralysis or some disease of that kind.

Contagiousness of Syphilis.—*C. A. G. writes: "I understand that there are a great many people in this country afflicted with syphilis. 1. Is this disease considered contagious? That is, is the germ carried from one to another on articles used that have been used by the diseased person? 2. If so, what would be the symptoms in taking the disease in this way?"*

Reply.—1. Yes. The danger of infection through handling objects that syphilitics have handled is not great. The danger from drinking from a cup used by a syphilitic is greater.

2. A sore appears at the point of contact. This comes two to three weeks after the infection. About two to three weeks after the appearance of the sore a rash appears on the skin.

Safety of Salvarsan.—*C. W. D. writes: "1. Is it dangerous for an apparently well person to take salvarsan? 2. Is there any sure test by which a person can detect syphilis? I have been informed by a physician that there is a medicine that is injected under the skin and if the proper sore develops this is a never failing sign that a person has syphilis."*

Reply.—1. There is some danger in taking a salvarsan whether one is sick or well.

2. Clinical symptoms, the spirochete test, the Noguchi test and the Wassermann test combined are reasonably sure.

Infection from an Unclean Toilet.—*G. D. S. asks: "Will you please name the diseases that may be contracted from an unclean toilet?"*

Reply.—Syphilis, gonorrhea and chancroid are possible. Infestation with body lice is also possible.

Cure of Syphilis.—*J. J. J. writes: "A man contracts blood poisoning and is given one injection of neosalvarsan when secondary symptoms appear. This is followed by 6 months of mercury injections in the muscle and patient is taking by mouth at same time. At the end of the six months three more injections of neosalvarsan are given followed by nearly one year of mercury injected twice each week. During last six months patient has been taking mercury by mouth. There have been no visible symptoms of the disease at any time during the two years' treatment. 1. Do you think enough treatment has been given? 2. Would you stop treatment for a Wassermann test? 3. How long after stopping treatment should Wassermann test be made? 4. If test is negative how soon should another be taken? 5. Does a cure insure a man against locomotor ataxia or paralysis later in life?"*

REPLY.—1. Another year of treatment would be safer.
2. No.
3. Say two months.
4. Two months.
5. Yes.

Relapse in Syphilis.—*P. writes: "1. How does a relapse in syphilis manifest itself. 2. Are the symptoms the same as those when the disease first made its appearance. 3. If a person has shown no symptoms of any kind for several years can he have a relapse?"*

REPLY.—1. By mucous patches, sores and a copper-colored to red, non-itching eruption on the skin.
2. Yes, practically so.
3. Yes, if he has not been thoroughly treated. However, the danger of a relapse lessens as each year passes.

Curability of Syphilis.—*W. H. writes: "1. Is syphilis in the primary part of the second stage curable? If so, how long a period does it take to effect a complete cure providing the victim is sound otherwise? 2. Is the disease so contagious as to compel person afflicted to remain away from family?"*

REPLY.—1. Yes. Treatment under the direction of a physician for three years is advised. If the treatment is very active at the start the treatment during the last two and a half years of this time can be quite mild.
2. Not if he takes proper precautions.

Neglected Gonorrhea.—*E. L. H. writes: "Please tell me what effect a case of gonorrhea will have on a man if allowed to run for say 6 or 8 weeks? Does it affect the blood as syphilis does?"*

REPLY.—Gonorrhea does not affect the blood. A gonorrhea lasting over six weeks may cause rheumatism, suppuration of the glands of the groin, prostate trouble, infection of the testicle, sterility, or it may become chronic.

Gonorrhea with Few Symptoms.—*A. B. N. writes: "Will you kindly tell me if it is possible for a man to contract an apparently gonorrheal infection from a woman who has no symptoms of that disease and who is especially neat in that respect?"*

REPLY.—Sometimes a case of gonorrhea is infectious even though there are very few symptoms.

Gleet.—*W. H. B. writes: "Is there a cure for gleet after it is about 18 months old? If so, what is it?"*

REPLY.—Gleet is mild chronic gonorrhea. It is infectious. It can be cured by persistent, scientific, local treatment.

Gonorrhea Not Inheritable.—*Reader writes: "If a man marries who has been cured from a case of gonorrhea will his children be healthy and strong?"*

REPLY.—Yes.

Contagiousness of Gonorrhea.—*H. M. S. asks: "1. May gonorrhea be transmitted by kissing, or otherwise than by sexual intercourse? 2. Is a chronic case of gonorrhea curable?"*

REPLY.—1. No to the first part of the question. Yes to the latter part. 2. Yes.

Gonorrheal Rheumatism.—*W. S. writes: "Please inform me if there is a cure for gonorrheal rheumatism. Have had it for seven weeks. Am cured of the gonorrhea. How long will it take to cure it? I feel it in my legs and ankles mostly."*

REPLY.—I doubt the accuracy of your statement that you are cured of your gonorrhea. I think a very careful examination will show that you still have a gonococcus infection of your prostate or some other locality. When you cure up your local infection your rheumatism will get well. In addition to treatment for gonorrhea take massage and baths. A vaccine will help you.

Varicocele.—*E. H. S. writes: "During the last two months I have noticed the appearance of a knotty growth on my scrotum, as if the veins were knotted together. A friend of mine tells me it is known as varicocele and is cured only by operation. Is this true or is there some other method? I am a healthy young man of 21 and a fair athlete. Until about three months ago I had taken no interest in girls. Then for about a month I 'made a fool of myself' with the result that I am sadder but wiser. I feel in perfect condition. Would go to a physician but am rather bashful and would rather not go unless it was absolutely necessary. Have heard it was quite a common complaint."*

REPLY.—It is a common complaint and one of no importance. Pay no attention to it. Do not talk to people about it.

A Rupture or Hydrocele.—*L. E. G. asks: "I am 50 years old. One of my testicles did not come down till I was quite old. Now it gets as big or bigger than a baseball. When I lie down it goes back but when I stand up it comes down again. Doesn't pain me much but feels rather uncomfortable. What can be done? If operation, would it be dangerous? I am very thin but comparatively strong."*

REPLY.—I think you should see a physician. It is possible you have a rupture or perhaps a hydrocele.

Varicocele.—*R. H. asks: "1. What are the effects of varicocele? 2. Are the cases of varicocele few or are there many of them? 3. What danger to the health and vitality in after years goes with it?"*

REPLY.—1. None or nearly none.
2. Many.
3. None.

Undescended Testicles.—*N. C. asks: "If the testes in a young man 20 years old have not yet descended to their natural position what would you advise? Is this condition liable to hurt the young man in later years?"*

REPLY.—You had better have a physician examine you. The condition probably will never harm you but the location of the organs may be of some importance.

Spermatorrhea.—*P. B. S. writes: "Is there a cure for a boy of eighteen years suffering from spermatorrhea? Would it be advisable to see a doctor about it?"*

REPLY.—The condition is of no consequence. Do not worry about it. You need not see a doctor.

Circumcision.—*L. A. J. writes: "1. Would be pleased to have you inform me the benefit of being circumcised. 2. How long would a person be laid up if he were circumcised? I am 21 years old."*

REPLY.—1. It is sometimes advantageous for reasons of cleanliness.
2. A week or less.

Night Losses.—*M. S. writes: "Kindly inform me if spermatorrhea or night losses can be cured. If so, how?"*

REPLY.—Probably there is no reason why it should be cured. It is a natural condition. Stop worrying.

Mucus from Urethra.—*W. L. A. writes: "1. I have wet dreams about once a week. Will the wet dreams hurt me? 2. When I have bowel movements and if I have to stay on the seat very long a drop or two of semen will come out but I have no sensation when it does. I am 20 years old, 4 feet 3½ inches tall, and weigh 114 pounds."*

REPLY.—1. No.
2. This is mucus from certain small glands. It is of no consequence.

Erections in a Child of no Consequence.—*L. D. writes: "Erections of little boys seem to give many parents much alarm. My boy is nearly four years old. He has some indigestion and only weighs 30 pounds. Some nights he gets several erections. A few nights he had as many as five or six at intervals of 30 minutes. These were exceptionably bad nights and were after the child had eaten a heavy supper. We are considered as educated people and as knowing how to raise a child. We have studied Holt but fail to be able to obtain any advice on the subject of erections. Doctors seem to give the matter little attention for I have consulted some of the best. I wanted to get your help."*

REPLY.—This is a matter of no consequence. Give the boy a light supper and have him void the urine just before retiring.

Self-Abuse.—*A Friend in Need writes: "I have been a victim of a vicious habit for four years but have now stopped. I am now 17½ years old. When a boy starts this habit and then stops the questions which come*

to his mind are: 1. Will it affect the length of my life? 2. What are its effects and can they be cured and how? 3. Will it affect my children if I have any?"

REPLY.—1 and 3. No.

2. There are no effects that need be lasting. You must cultivate self-control as you would cultivate the ability to keep from drinking whisky, stealing or giving away to fits of anger. The person who yields shows that he is weak-willed and the will becomes weaker from yielding. To help in self-control you must not drink nor overeat nor listen to smutty stories. Keep in good physical trim and associate with clean, strong-willed people.

Masturbation in a Child.—*Mrs. J. C. C. writes: "1. Would masturbation in a child necessarily tend to make him or her a degenerate man or woman incompetent of being normal? 2. What is the treatment or cure? 3. Is this condition hereditary?"*

REPLY.—1. No.

2. The habit is not difficult to break. Either the hands or the legs should be fastened, according to the circumstances. Surgical supply houses have hand covers and thigh fasteners for the purpose.

3. It is not hereditary. In most instances, the children are taught the habit by their nurses or other attendants.

Stupidity and Self-Abuse.—*Worried writes: "A boy nearly 17 years old has supposedly from childhood been dissipating by handling his sexual organs. He does not inherit such immoral traits. He is stupid in most of his studies, takes no interest in his work and, consequently, is severely scolded at all times by his father. His home surroundings are not specially pleasant. What will be the result if the practice is continued? Does such dissipating have any serious effect on the mind?"*

REPLY.—It is more likely that the boy's sex habits are the result of a poor mind than that his poor mind is the result of his bad sex habits. My advice is that you have the boy examined by someone who specializes in children's minds. Perhaps he has dementia precox. Perhaps he is a mental defective of another sort.

A Worrier.—*X. Y. Z. writes: "A young man having had considerable trouble over which he constantly brooded for the past eight months has now reached the stage where he constantly worries over what appears to have been an abnormal immoral act committed by himself. The act was of no seriousness except that he has magnified it to large proportions and, although fully conscious of that fact himself, cannot overcome it. If not worrying over this particular act he will revert back to the original trouble. He has made several attempts to work but cannot seem to pull himself through, until he is now broken in spirit. Do you think it possible for one having only small means to cure this condition without resorting to a sanitarium, of which place I have a horror. Is this neurasthenia or nervous prostration? Will it lead to insanity?"*

REPLY.—The man is a worrier or a neurasthenic. Occasionally, such a man can cure himself of his bad mental habit by studying daily from some such book as "Worry and Nervousness" by Sadler or a Christian Science textbook.

Fear and Worry.—*J. R. T. writes: "Will you please prescribe a remedy for partial impotency? The desire is as great as ever and sterility does not seem to be affected. There is so much quackery about this disease, I hate to go to the advertising doctors."*

REPLY.—Your condition is the result of fear. Quit thinking about your sex organs and your sex acts. That is all you need do.

A Sexual Neurasthenic.—*C. S. L. writes: "I am 23 years old and intend to marry soon. This is why I am writing to you for some advice. First of all, I have no bad habits. I am 5 feet 8 in. tall, weight, 142 pounds. My condition is: nervousness (nervous debility), dizzy, continuous headache, sometimes no ambition to work, cannot gain any flesh although I eat everything suitable and retire about 10* P. M.

"1. For the past few months I get from one to four times a week 'nightly losses.' Will this, when continued, cause locomotor ataxia or other disease? 2. Is chromium sulphate of any aid to stop the losses?"

REPLY.—1. No. Exercise in the open air, stop worrying, keep your thoughts clean and marry. You are and will be all right.

2. No.

Doubting Daisy writes: "How is a young girl to know if it is right to marry a man in a town who is supposed to have sowed oats once, the wild variety, and was laid up sick, so gossip goes, and who is not strong, but very nice, kind, generous, and anxious for a home and wife. No one will say what he had or what he has and would he ask me to marry him if he knew he was diseased? How can any clean girl know what she is getting when no one will say and she can't ask him? All I know is learned from the movies—'Damaged Goods' and 'Ghosts'—and one of the older women in town told me he was 'unfit for marriage,' and when I asked her why she changed the subject.

"I have no mother and am only 18 and in perfect health. He seems to be crazy over me but I don't love him enough to raise idiots and bury a lot of innocent babes full of poison. On the other hand, I'd be the happiest girl alive today to know for sure he is clean and healthy, for that suspicion is the only toad under my rosebush.

"Please tell me, Dr. Evans, must I leap in the dark, as so many of my earthly sisters have done? To me good health and the joy of living make life. I can't bear to think of sickness and doctors' offices and undertakers and wreaths. It's hateful. I reason out—if he is diseased and I ask him he will act the offended stunt and where am I? Do they ever acknowledge it? Would I acknowledge it if it meant the losing of wife, home and happiness?

"Dr. Evans, please tell me as if I was a little sister how I can tell. What are the danger signals? And I'm writing in the 20th century, too! What a thought! The dogs and live stock are far better off when it comes to mating for human intelligence directs. We just blunder along and litter up the earth with halfwits. Why don't you doctors help us? Why is it charming men with real personalities are so often the ones rumor says are poisonous? Oh, I'm so puzzled and so miserable."

REPLY.—A number of questions but no answer.

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